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Technical Bulletin No. 19 - Revised

Oregon State Highway Department

SALEM, OREGON

R. H. BALDOCK, State Highway Engineer
W. C. WILLIAMS, Assistant State Highway Engineer

Manual of Instructions for Construction Department Employees

Prepared under the supervision of
H. G. SMITH, Construction Engineer

by

H. W. LIBBY, Assistant Staff Engineer
F. O. SCOTT, Engineer Designer

Published by

OREGON STATE HIGHWAY COMMISSION
SALEM

BEN R. CHANDLER, *Chairman*
CHAS. H. REYNOLDS, Commissioner MILO K. McIVER, Commissioner

1953

OREGON STATE
HIGHWAY DEPARTMENT
TRAFFIC ENGINEERING DIV.
SALEM, OREGON
TECHNICAL LIBRARY COPY

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To All Employees of the Construction Department
of the Oregon State Highway Commission:

The object of this manual is to acquaint new employees with the requirements of the Department as well as to afford a concise and ready reference for old employees to matters covered by circular letters or instructions on specific situations.

A further object of this manual is to standardize the work to the end that all employees will handle the work in a uniform manner and know what is expected of them. While some of these instructions may seem elementary and unnecessary, they are as a rule based upon points where mistakes and differences of methods and practice have been most frequent in the past. It is not intended, however, to cover in this manual every possible contingency that may arise in the field or in the office work, but to state the points on which strict uniformity is necessary and to indicate methods and acquaint the field with the forms which will produce the desired results. While in the employ of the Highway Commission, one is expected to accomplish two things: First, secure well executed work; Second, secure the cooperation and interest of the people in the community in which the work is situated. One must bear in mind that his actions will govern the opinion the local people will form not only of the piece of work in hand but of the conduct of the Department as a whole. Employees should always give courteous attention and consideration to all inquiries for information and endeavor to furnish any data which they may have or refer the question to their superior.

It might be suggested that the employee is not expected to burden his memory with the detail of these entire instructions, but should familiarize himself with the general provisions and consult them frequently for specific instructions concerning any particular work at hand.

It is realized that various conditions may arise in the field work which will require different methods. These instructions are not intended as a hard and fast rule, but as a guide to secure uniformity and a completeness of records, together with the best results at a minimum cost. Employees will be judged by this standard. Any suggestion of improvement in the method of work or form of record will be appreciated at any time.

It is to be clearly understood that the instructions contained in this manual are not a part of any contract, and in case of a conflict, the contract specifications shall govern.

Very truly yours,

R. H. BALDOCK,
State Highway Engineer

By
H. G. SMITH,
Construction Engineer

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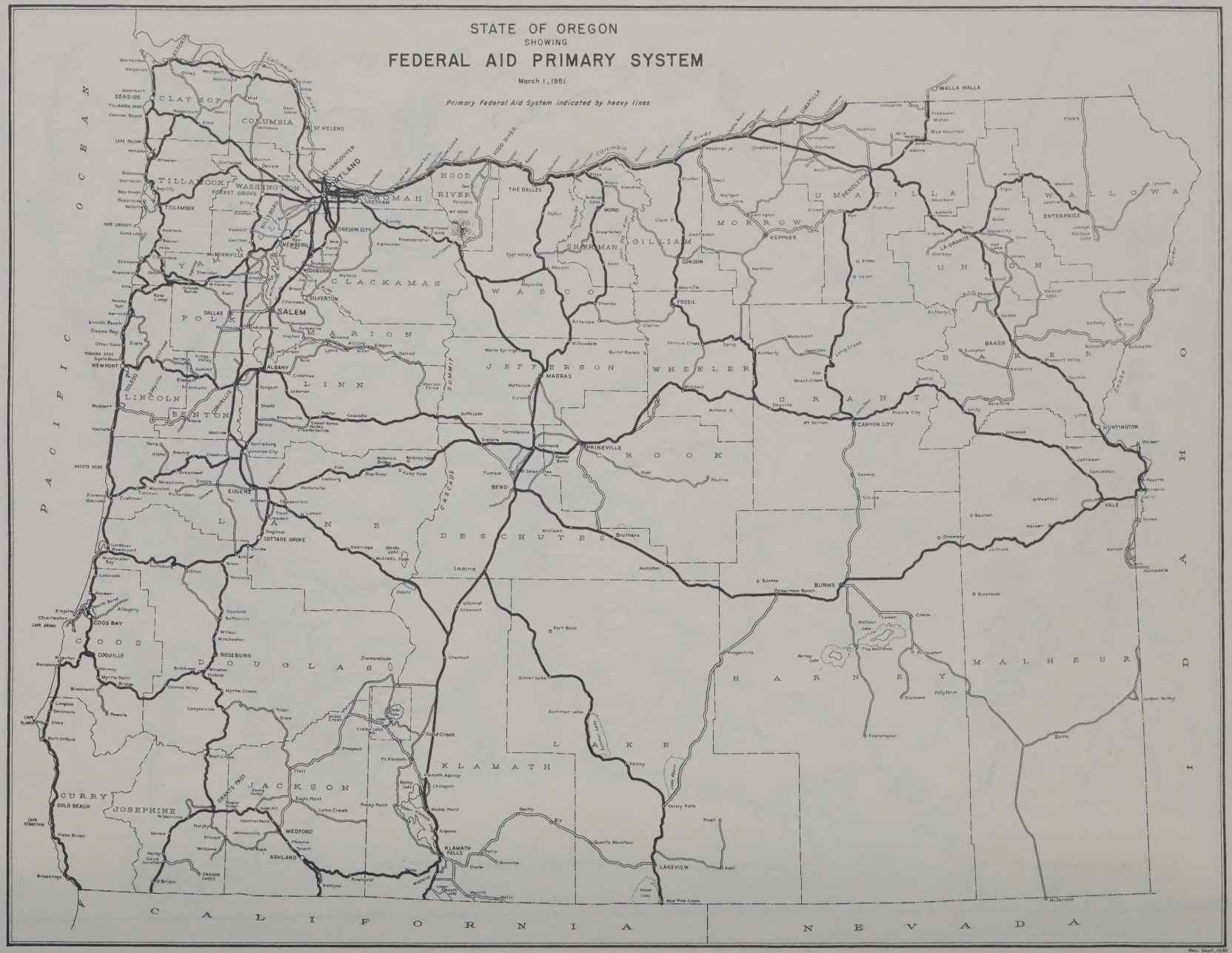
31. Membership in Organizations.
32. Garnishments and Assignments of Wages.
33. Research Work.

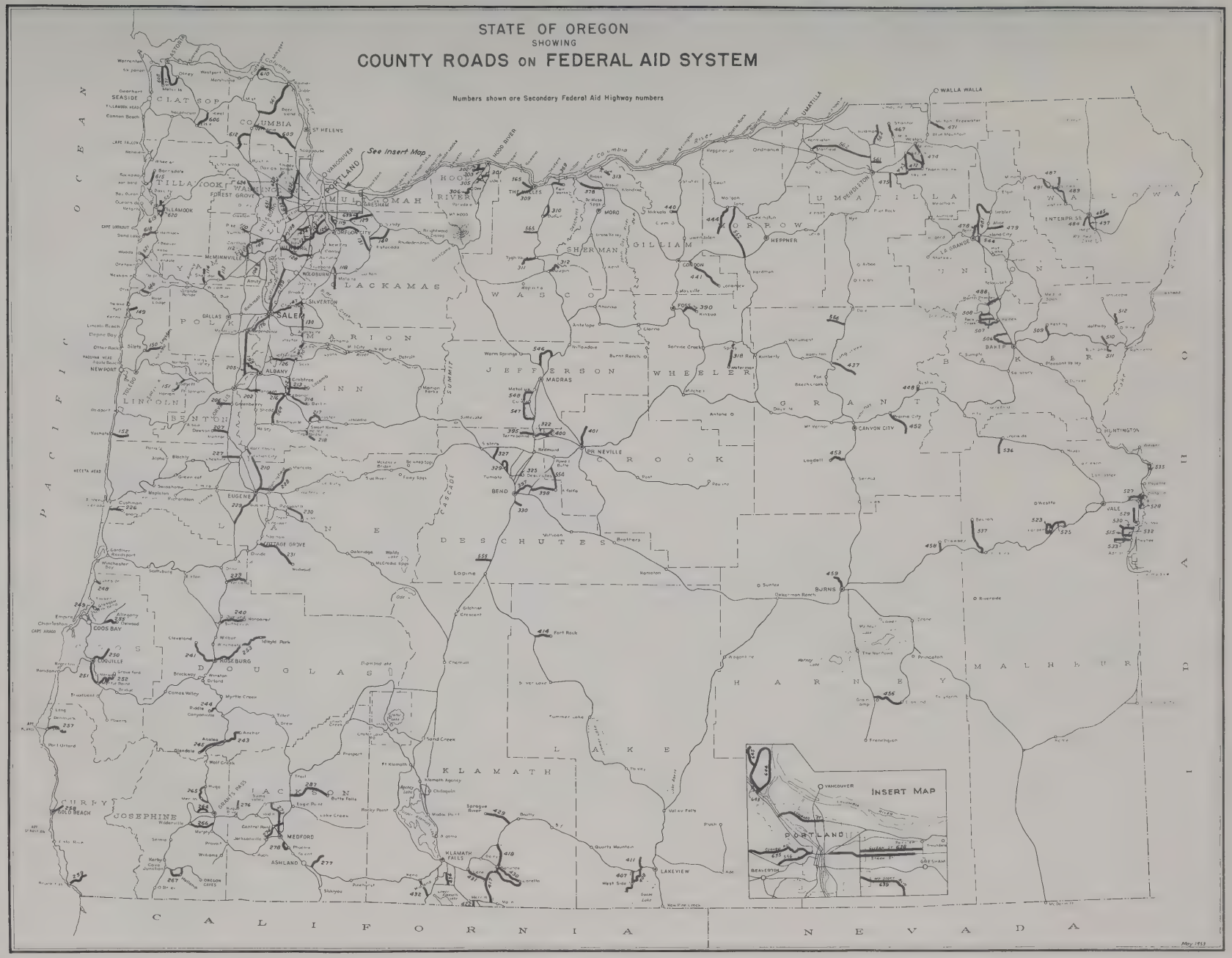
STATE OF OREGON
Showing
SYSTEM of STATE HIGHWAYS
NOTE: The Highway Index Numbers as shown on this map should not be confused with Highway Route Numbers which appear on Traveled Road Maps and Road Signs.
LEGEND
30 Primary Highways
330 Secondary Highways
PACIFIC OCEAN
CALIFORNIA
NEVADA
IDAHO
WALLA WALLA
CLATSOP
COLUMBIA
TILLAMOOK
WASHINGTON
MULTNOMAH
CLACKAMAS
YAMHILL
POLK
MARION
LINCOLN
BENTON
LINN
LANE
DOUGLAS
COOS
CURRY
JOSEPHINE
JACKSON
KLAMATH
HOOD RIVER
WASCO
SHERMAN
GILLIAM
MORROW
UMATILLA
UNION
WALLOWA
BAKER
GRANT
WHEELER
JEFFERSON
CROOK
DESCHUTES
LAKE
HARNEY
MALHEUR
ASTORIA
SEASIDE
ST. HELENS
PORTLAND
HILLSBORO
FOREST GROVE
TILLAMOOK
McMINNVILLE
NEWBERG
OREGON CITY
WOODBURN
SILVERTON
SALEM
DALLAS
ALBANY
CORVALLIS
NEWPORT
TOLEDO
EUGENE
COTTAGE GROVE
COOS BAY
COQUILLE
ROSEBURG
GRANTS PASS
GOLD BEACH
MEDFORD
ASHLAND
KLAMATH FALLS
LAKEVIEW
BEND
PRINEVILLE
MADRAS
HOOD RIVER
THE DALLES
MORO
CONDON
FOSSIL
HEPPNER
PENDLETON
LA GRANDE
ENTERPRISE
BAKER
CANYON CITY
BURNS
HUNTINGTON
VALE
12 '53

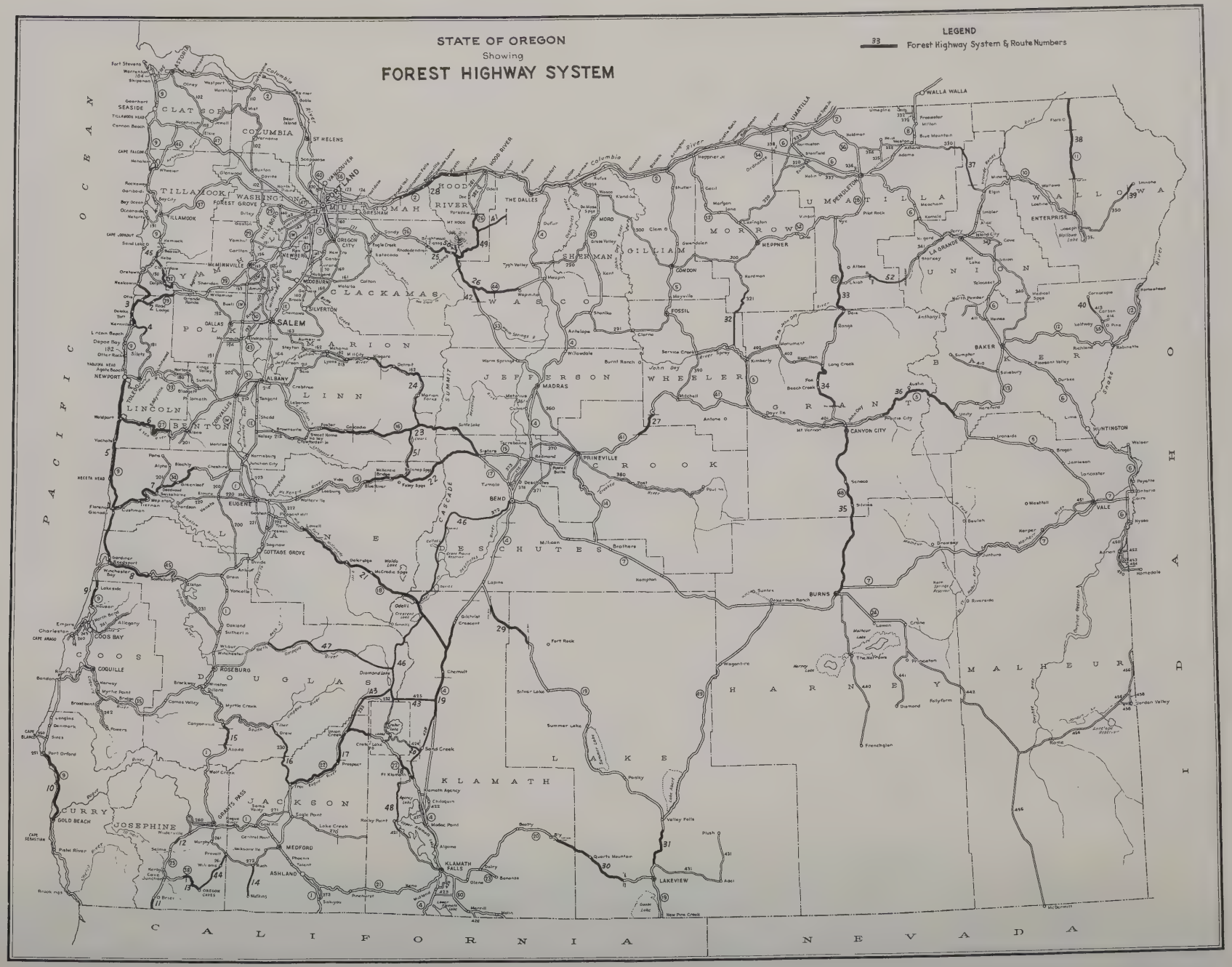
STATE OF OREGON
SHOWING
FEDERAL AID PRIMARY SYSTEM
March 1, 1951

Primary Federal Aid System indicated by heavy lines



Rev. Sept. 1950


STATE OF OREGON
SHOWING
COUNTY ROADS ON FEDERAL AID SYSTEM
Numbers shown are Secondary Federal Aid Highway numbers
See Insert Map
INSERT MAP
PACIFIC OCEAN
CALIFORNIA
NEVADA
IDAHO
CLATSOP
COLUMBIA
TILLAMOOK
WASHINGTON
MULTNOMAH
HOOD RIVER
CLACKAMAS
YAMHILL
POLK
MARION
LINCOLN
BENTON
LINN
LANE
DOUGLAS
COOS
CURRY
JOSEPHINE
JACKSON
KLAMATH
LAKE
DESCHUTES
JEFFERSON
WASCO
SHERMAN
GILLIAM
MORROW
UMATILLA
UNION
WALLOWA
WHEELER
GRANT
BAKER
CROOK
HARNEY
MALHEUR
PORTLAND
SALEM
EUGENE
ROSEBURG
MEDFORD
ASHLAND
BEND
PRINEVILLE
MADRAS
THE DALLES
HOOD RIVER
HEPPNER
PENDLETON
WALLA WALLA
BURNS
LAKEVIEW
KLAMATH FALLS
COOS BAY
NEWPORT
GOLD BEACH
CANYON CITY
VALE
HUNTINGTON
LA GRANDE
ENTERPRISE
VANCOUVER
BEAVERTON
GRESHAM
May 1953


STATE OF OREGON
Showing
FOREST HIGHWAY SYSTEM
LEGEND
33 Forest Highway System & Route Numbers
PACIFIC OCEAN
CALIFORNIA
NEVADA
IDAHO
CLATSOP
COLUMBIA
TILLAMOOK
WASHINGTON
HOOD RIVER
WASCO
SHERMAN
GILLIAM
MORROW
UMATILLA
UNION
WALLOWA
YAMHILL
CLACKAMAS
MARION
POLK
LINCOLN
BENTON
LINN
JEFFERSON
WHEELER
GRANT
BAKER
CROOK
DESCHUTES
KLAMATH
LAKE
HARNEY
MALHEUR
COOS
DOUGLAS
JACKSON
JOSEPHINE
CURRY
ST HELENS
PORTLAND
SALEM
EUGENE
ROSEBURG
COOS BAY
MEDFORD
ASHLAND
GOLD BEACH
KLAMATH FALLS
LAKEVIEW
BEND
PRINEVILLE
MADRAS
THE DALLES
PENDLETON
WALLA WALLA
BAKER
ENTERPRISE
JOHN DAY
CANYON CITY
HUNTINGTON
VALE
ONTARIO
BURNS
HEPPNER
CONDON
FOSSIL
ALBANY
CORVALLIS
NEWPORT
LINCOLN CITY
TILLAMOOK
ASTORIA
SEASIDE
GRESHAM
OREGON CITY
MCMINNVILLE
WOODBURN
SILVERTON
LEBANON
SWEET HOME
CRESWELL
COTTAGE GROVE
OAKRIDGE
SUTHERLIN
REEDSPORT
NORTH BEND
COQUILLE
MYRTLE POINT
ROSEBURG
GRANTS PASS
CAVE JUNCTION
CRESCENT LAKE
SUMMER LAKE
LAKE ABERT
FORT ROCK
CHEMULT
SISTERS
REDMOND
MADRAS
METOLIUS
CULVER
CROOKED RIVER
PAULINA
SILVIES
SENECA
DAYVILLE
MT VERNON
LONG CREEK
MONUMENT
SPRAY
KIMBERLY
FOSSIL
ANTELOPE
SHANIKO
WAPINITIA
MAUPIN
DUFUR
MOSIER
HOOD RIVER
PARKDALE
MT HOOD
ODELL
DEE
SANDY
ESTACADA
BRIGHTWOOD
ZIGZAG
RHODODENDRON
SALMON
CLOUD CAP
TYGH VALLEY
GRASS VALLEY
KENT
SHERIDAN
GRANDE RONDE
WILLAMINA
DAYTON
NEWBERG
CARLTON
YAMHILL
MCMINNVILLE
AMITY
DALLAS
INDEPENDENCE
MONMOUTH
ALBANY
TANGENT
HALSEY
SWEET HOME
LEBANON
SCIO
MILL CITY
DETROIT
IDANHA
MARION FORKS
SUMMIT
SANTIAM
SANTIAM PASS
SUTTLE LAKE
BLACK BUTTE
SISTERS
REDMOND
TERREBONNE
CULVER
METOLIUS
MADRAS
WARM SPRINGS
WILLOWDALE
BURNT RANCH
SERVICE CREEK
SPRAY
KIMBERLY
MONUMENT
HAMILTON
LONG CREEK
DAYVILLE
MT VERNON
CANYON CITY
PRAIRIE CITY
BEECH CREEK
AUSTIN
MITCHELL
ANTONE
SHANIKO
ANTELOPE
CLARNO
FOSSIL
CONDON
MORGAN LANE
LEXINGTON
HEPPNER
IONE
CECIL
SHUTTER
WASCO
KENDALL
DUFUR
THE DALLES
DESCHUTES
BEAVER
TYGH VALLEY
GRASS VALLEY
MORO
GRASS VALLEY
KENT
SHERIDAN
GRANDE RONDE
WILLAMINA
DAYTON
NEWBERG
CARLTON
YAMHILL
MCMINNVILLE
AMITY
DALLAS
INDEPENDENCE
MONMOUTH
ALBANY
TANGENT
HALSEY
SWEET HOME
LEBANON
SCIO
MILL CITY
DETROIT
IDANHA
MARION FORKS
SUMMIT
SANTIAM
SANTIAM PASS
SUTTLE LAKE
BLACK BUTTE
SISTERS
REDMOND
TERREBONNE
CULVER
METOLIUS
MADRAS
WARM SPRINGS
WILLOWDALE
BURNT RANCH
SERVICE CREEK
SPRAY
KIMBERLY
MONUMENT
HAMILTON
LONG CREEK
DAYVILLE
MT VERNON
CANYON CITY
PRAIRIE CITY
BEECH CREEK
AUSTIN
MITCHELL
ANTONE
SHANIKO
ANTELOPE
CLARNO
FOSSIL
CONDON
MORGAN LANE
LEXINGTON
HEPPNER
IONE
CECIL
SHUTTER
WASCO
KENDALL
DUFUR
THE DALLES
DESCHUTES
BEAVER
TYGH VALLEY
GRASS VALLEY
MORO
GRASS VALLEY
KENT
SHERIDAN
GRANDE RONDE
WILLAMINA
DAYTON
NEWBERG
CARLTON
YAMHILL
MCMINNVILLE
AMITY
DALLAS
INDEPENDENCE
MONMOUTH
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SCIO
MILL CITY
DETROIT
IDANHA
MARION FORKS
SUMMIT
SANTIAM
SANTIAM PASS
SUTTLE LAKE
BLACK BUTTE
SISTERS
REDMOND
TERREBONNE
CULVER
METOLIUS
MADRAS
WARM SPRINGS
WILLOWDALE
BURNT RANCH
SERVICE CREEK
SPRAY
KIMBERLY
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HAMILTON
LONG CREEK
DAYVILLE
MT VERNON
CANYON CITY
PRAIRIE CITY
BEECH CREEK
AUSTIN
MITCHELL
ANTONE
SHANIKO
ANTELOPE
CLARNO
FOSSIL
CONDON
MORGAN LANE
LEXINGTON
HEPPNER
IONE
CECIL
SHUTTER
WASCO
KENDALL
DUFUR
THE DALLES

Article 5—Primary State Highways

State Highway No.	Highway Name
1W	Pacific Highway West (Jc. Union Ave., to Junction City, via McMinnville and Corvallis)
1E	Pacific Highway East (Washington State Line to Junction City, via Milwaukie, Salem and Albany)
1	Pacific Highway (Junction City to California State Line)
2	Columbia River Highway
3	Oswego
4	The Dalles-California
5	John Day
6	Old Oregon Trail
7	Central Oregon
8	Oregon-Washington
9	Oregon Coast
10	Wallowa Lake
11	Enterprise-Lewiston
12	Baker-Homestead
13	Baker-Unity
14	Crooked River
15	McKenzie
16	Santiam
17	McKenzie-Bend
18	Willamette
19	Fremont
20	Klamath Falls-Lakeview
21	Green Springs
22	Crater Lake
23	Dairy-Bonanza
24	Burns-Crane
25	Redwood
26	Mt. Hood
27	Alsea
28	Pendleton-John Day
29	Tualatin Valley
30	Salem-Dallas
31	Albany-Corvallis
32	Three Rivers
33	Corvallis-Newport
34	Siuslaw
35	Coos Bay-Roseburg
36	Pendleton-Cold Springs
37	Wilson River
38	Oregon Caves
39	Salmon River
40	Beaverton-Hillsdale
41	Ochoco
42	Sherman
43	Monmouth-Independence
44	Wapinitia
45	Umpqua
46	Necanicum
47	Sunset
48	John Day-Burns
49	Lakeview-Burns
50	Klamath Falls-Malin
51	West Portland-Hubbard
52	Heppner
53	Warm Springs
54	Boardman-Stanfield
55	Halfway
56	T. H. Banfield Expressway
57	Portland-Salem Expressway

Article 6—Secondary State Highways

County	Highway No.	Name
Baker	340	Medical Springs
	410	Sumpter Valley
	411	Haines-Anthony
	413	Halfway-Cornucopia
	414	Pine Creek
Benton	180	Eddyville-Blodgett
	191	Kings Valley
	200	Territorial
	201	Alsea-Deadwood
	210	Corvallis-Eastside
Clackamas	141	Beaverton-Aurora
	160	Cascade
	161	Woodburn-Estacada
	170	Canby-Marquam
	171	Clackamas
	172	Eagle Creek-Sandy
	173	Timberline
Clatsop	102	Nehalem
	103	Fishhawk Falls
	104	Fort Stevens
	105	Warrenton
Columbia	102	Nehalem
	110	Mist-Clatskanie
Coos	240	Cape Arago
	241	Coos River
	242	Powers
	243	Empire-Coos Bay
Crook	360	Madras-Prineville
	370	O'Neil
	371	Powell Butte
	380	Paulina
Curry	250	Cape Blanco
	251	Port Orford
Deschutes	370	O'Neil
	371	Powell Butte
	372	Century Drive
	373	Cline Falls
	374	Tumalo-Deschutes
	375	Redmond-Bend
Douglas	200	Territorial
	230	Tiller-Trail
	231	Elkton-Sutherlin
	232	Crater Lake-North
	233	West Diamond Lake
	425	East Diamond Lake
Gilliam	300	Wasco-Heppner
Grant	401	Beech Creek
	402	Kimberley-Long Creek
Harney	440	Frenchglen
	441	Diamond Valley
	442	Rome-Princeton
Hood River	281	Hood River
	282	Odell
Jackson	230	Tiller-Trail
	233	West Diamond Lake
	270	Little Butte
	271	Sam's Valley
	272	Medford-Provolt
	273	Siskiyou
Jefferson	360	Madras-Prineville
	361	Culver
Josephine	260	Rogue River Loop
	261	Williams
Klamath	420	Midland
	421	Klamath Lake
	422	Chiloquin
	423	Lower Klamath
	424	Sand Creek
	425	East Diamond Lake
	426	Hatfield
	427	Modoc Point
	428	Sun Mountain
	429	Crescent Lake
Lake	431	Warner
Lane	200	Territorial
	201	Alsea-Deadwood
	220	Richardson-Eugene
	221	Fox Hollow
	222	Springfield-Creswell
	223	Junction City-Eugene
	224	W. 7th Street-W. 11th Street
	225	Macveigh
Lincoln	180	Eddyville-Blodgett
	181	Siletz
	182	Otter Rock
Linn	162	North Santiam
	164	Jefferson
	210	Corvallis-East Side
	211	Albany-Lyons
	212	Halsey-Sweet Home
	213	Mehama-Mill City
	214	Albany Airport
Malheur	442	Rome-Princeton
	450	Nyssa-Adrian
	451	Vale-West
	452	Adrian-Parma
	453	Adrian-Arena
	454	Adrian-Caldwell
	456	I. O. N.
	458	Jordan Valley
Marion	140	Hillsboro-Silverton
	141	Beaverton-Aurora
	160	Cascade
	161	Woodburn-Estacada
	162	North Santiam
	163	Silver Creek Falls
	164	Jefferson
	213	Mehama-Mill City

Article 6—Secondary State Highways—Continued

County	Highway No.	Name
Morrow	300	Wasco-Heppner
	320	Lexington-Echo
	321	Heppner-Spray
Multnomah	120	Swift
	122	Vancouver Avenue
	123	Northeast Portland
	124	Sun Dial
	125	Crown Point
	160	Cascade
Polk	150	Salem-Dayton
	191	Kings Valley
	192	Dallas-Coast
	193	Independence
	194	Monmouth
Sherman	290	Sherars Bridge
	300	Wasco-Heppner
	301	Fulton Canyon-Wasco
Tillamook	130	Little Nestucca
	131	Netarts
Umatilla	320	Lexington-Echo
	330	Weston-Elgin
	332	Sunnyside-Umapine
	333	Hermiston
	334	Athena-Holdman
	335	Havana-Helix
	337	Stanfield-Pendleton
	338	Ordnance Depot
	339	Freewater
Union	330	Weston-Elgin
	340	Medical Springs
	341	Starkey
	342	Cove
	343	La Grande-North Powder
Wallowa	350	Little Sheep Creek
	351	Joseph-Wallowa Lake
Wasco	290	Sherars Bridge
	291	Shaniko-Fossil
Washington	102	Nehalem
	140	Hillsboro-Silverton
	141	Beaverton-Aurora
	142	Farmington
	143	Scholls
Wheeler	291	Shaniko-Fossil
	321	Heppner-Spray
	390	Service Creek-Mitchell
Yamhill	140	Hillsboro-Silverton
	150	Salem-Dayton
	151	Yamhill-Newberg
	152	Three Mile Lane
	153	Bellevue-Hopewell
	154	Lafayette
	155	Amity-Dayton
	156	McMinnville

ARTICLE 7

Federal-Aid Primary Highway System

Federal Route No.	Highway	Total Federal Aid Mileage Inclusive of Miles Within Reservations	Mileage Within National Forests	Mileage Within Indian Reservations	Total Federal Aid Mileage Exclusive of Miles Within Reservations
1	Astoria to Ontario	473.9	29.6	* 24.4	419.9
2	Oregon Coast	389.9	46.4	† 0.3	343.2
3	Pacific	317.3	7.5	.....	309.8
4	The Dalles-California	274.3	19.5	50.1	204.7
5	Eugene to Ontario	384.8	86.0	.....	298.8
6	Arlington to Rock Creek	123.6	.....	.....	123.6
7	La Grande to Enterprise	65.9	.....	.....	65.9
9	Pacific West	100.9	.....	.....	100.9
10	Albany-Corvallis	8.5	.....	.....	8.5
11	McMinnville-Tillamook	48.7	13.4	.....	35.3
12	Sherman	69.0	.....	.....	69.0
14	Coos Bay-Roseburg	61.8	.....	.....	61.8
15	Green Springs	55.3	1.6	.....	53.7
16	Fremont	158.3	14.3	.....	144.0
17	Redwood	42.3	0.9	.....	41.4
18	Boardman to Wallula	37.7	.....	.....	37.7
19	Pendleton to Washington State Line	36.5	.....	.....	36.5
20	Umpqua	50.1	0.6	.....	49.5
21	Bend to Burns	130.5	.....	.....	130.5
22	Corvallis-Newport	55.9	.....	.....	55.9
23	Salmon River	21.9	.....	.....	21.9
24	Portland to Maupin	92.5	37.0	.....	55.5
25	Siuslaw	67.3	17.6	.....	49.7
26	East Portland-Oregon City	6.9	.....	.....	6.9
27	Sunset	59.5	.....	.....	59.5
28	Cannon Beach Road	21.0	.....	.....	21.0
29	Willamette	87.2	64.1	.....	23.1
30	Pendleton-John Day	120.5	16.7	.....	103.8
31	Burns to Vale	115.0	.....	.....	115.0
32	Tualatin Valley	39.0	.....	.....	39.0
33	Klamath Falls-Weed	14.3	.....	.....	14.3
34	Boyer-Dolph	5.6	4.9	.....	0.7
35	Tillamook to Banks	54.3	.....	.....	54.3
37	Santiam	101.2	53.5	.....	47.7
39	Base Line Road	8.4	.....	.....	8.4
41	82nd Avenue	7.6	.....	.....	7.6
42	West Portland-Hubbard	17.5	.....	.....	17.5
44	Warm Springs	46.4	7.0	27.0	12.4
46	Salem By-Pass	9.9	.....	.....	9.9
	Totals	3,781.2	420.6	101.8	3,258.8

* Includes 2.2 miles in Celilo Canal Reserve
† Cape Perpetua Lighthouse Reserve
(All mileages are exclusive of mileage in Federal Aid Urban System.)

ARTICLE 8

FEDERAL AID URBAN HIGHWAY SYSTEM

Portland Urban Area		*Approved Length*
260001	Connection with FAP 1, west urban boundary via NW 19th Ave., W. & E. Burnside Street, NE Sandy Blvd. to connection with FAP 1 at east urban boundary	23.4
260003	Connection with FAP 3, south urban boundary to Junction FAU 260024 at the west end of the Ross Island Bridge	2.8
260009	Connection with FAP 9, south urban boundary via SW 4th Ave., and SW Sheridan St., and Broadway Bridge to Junction FAU 260026 near South end of Interstate Bridge	11.5
260024	Junction FAU 260009 near intersection of SW 4th Ave. & Sheridan St., via Ross Island Bridge to connection with FAP 24, east urban boundary	6.7
260026	Connection with FAP 26, south urban boundary via McLoughlin Blvd., SE & NE Union Ave. to connection with FAU 170001 in Vancouver at north urban boundary	11.7
260027	Connection with FAP 27, west urban boundary via Sylvan to FAU 260009 near intersection of SW Jefferson and 4th Avenue.	6.0
260032	Connection with FAP 32, west urban boundary at Beaverton to Junction FAU 260027 near Sylvan	3.4
260039	Junction FAU 260001 near intersection E. Burnside St. & NE Sandy Blvd. to connection with FAP 39, east urban boundary	4.6
260040	Junction FAU 260001 at west end of St. Johns Bridge via St. Johns Bridge to Junction FAU 260001 near intersection of NE Sandy & Columbia Blvds.	10.9
260041	Connection with FAP 41, south urban boundary to Junction FAU 260001 near intersection NE 82nd Ave. and Sandy Blvd.	5.8
260043	Junction with FAU 260009 near intersection of SW Abernathy St. & Barbur Blvd. via Steel Bridge to Junction FAU 260009 near the intersection of N. Interstate Ave. & Tillamook St.	3.4
260045	Junction FAU 260001 at east end of Burnside Bridge thru Sullivan Gulch to Junction FAU 260001 near Sundial	14.0
Salem Urban Area		
280003	Connection with FAP 3, south urban boundary via S. Commercial, Court, N. Capitol Streets to FAP 3, north urban boundary	5.3
280123	Connection with FAS 123, west urban boundary via Center St. to Junction FAU 280003 at Capitol and Center Streets	2.4
	Total Approved FAU Mileage	111.9

ARTICLE 9

Secondary Federal-Aid Highway System

The mileages given in this table are inclusive of mileages within cities, towns and urban areas.

F. A. S. No.	Name	Termini	Length in Miles
100	Three Mile Lane	FA 9 in McMinnville-FA 9 at Dayton Junction	8.26
101	Yamhill-Newberg	FA 32 in Yamhill-FA 9 in Newberg	11.65
102	Silverton-Newberg	FAS 147 in Silverton-FA 9 in Newberg	32.04
103	Bellevue-Hopewell	FA 11 at Bellevue-FAS 116 east of Hopewell	14.89
104	Lafayette (Part Co. Rd.)	FAS 103 north of Hopewell-FAS 100 and 105 west of Dayton	6.25
105	Amity-Dayton	FA 9 north of Amity-FAS 100 east of McMinnville	7.03
108	Springbrook-Chehalem Mt. (Co. Rd.)	FA 9 northeast of Newberg-FAS 650 near Chehalem Mt.	2.95
109	Carlton-Chehalem Creek (Co. Rd.)	FA 32 in Carlton-FAS 101 northwest of Newberg	5.68
110	Pike-Yamhill (Co. Rd.)	Pike-FA 32 in Yamhill	4.79
111	McMinnville-Carlton (Co. Rd.)	FAS 112 north of McMinnville-FA 32 in Carlton	6.39
112	Baker Creek-McMinnville (Co. Rd.)	Baker Creek-FA 9 in McMinnville	6.85
113	Gopher Valley (Co. Rd.)	FA 11 east of Sheridan-Gopher Valley	4.50
114	Willamina-Coast Creek (Co. Rd.)	FA 11 in Willamina-Coast Creek	6.30
115	Mt. Hood	FA 24 near Government Camp-FA 1 at Hood River	44.80
116	Salem-Dayton	U 280-123 in Salem-FAS 100 in Dayton	20.17
117	Marquam-Canby	FAS 140 west of Molalla-FA 3 at Canby	8.02
118	Wilhoit-Molalla-Liberal (Co. Rd.)	Wilhoit-FAS 147 at Liberal	9.09
119	Milwaukie-Gladstone (Co. Rd.)	Milwaukie-FA 41 in Gladstone	4.79
120	West Linn-Oswego-Wilsonville Road (Co. Rd.)	FA 3 in West Linn-FAS 122 southwest of Oswego	5.82
121	North Santiam	FAS 127 west of Shaw-FA 37 at Santiam Junction	78.00
122	Newberg-Wilsonville-Oswego (Co. Rd.)	FA 9 northeast of Newberg-FA 3 at Oswego	23.19
123	Salem-Dallas	FAS 190 in Dallas-U 280-123 in Salem	13.37
124	Mehama-Mill City	FAS 121 at Mehama-FAS 121 at Mill City	8.78
125	Jefferson	FA 3 southwest of Jefferson-FA 3 at Steiwer Hill	8.23
126	Greensbridge-Scio (Co. Rd.)	FAS 125 at Jefferson-FAS 220 at Scio	9.11
127	Silver Creek Falls	U 280-003 in Salem-FAS 147 in Silverton	40.82
128	Yergen Corner-Aurora (Co. Rd.)	FAS 102 south of Newberg-FAS 622 at Aurora	11.33
129	Clackamas-Boring (Part Co. Rd.)	FA 41 at Clackamas-FA 24 northwest of Sandy	12.50
130	Sublimity-Silverton (Co. Rd.)	FAS 121 in Sublimity-FAS 147 in Silverton	13.20

Continued

F. A. S. No.	Name	Termini	Length in Miles
131	Parkplace-Estacada (Co. Rd.)	FA 41 at Parkplace-FAS 140 southwest of Estacada	16.86
132	Clackamas-Eagle Creek	FAS 129 east of Clackamas-FAS 141 at Eagle Creek	10.05
137	Dallas-Coast	FA 11 east of Valley Junction-FAS 123 in Dallas	14.83
138	Monmouth-Independence	FA 9 in Monmouth-FAS 142 and FAS 193 in Independence	2.35
139	Monmouth	FAS 190 south of Dallas-FA 9 in Monmouth	7.20
140	Woodburn-Sandy (Part Co. Rd.)	FA 3 north of Woodburn-FA 24 east of Sandy	48.31
141	Eagle Creek-Sandy	FA 24 in Sandy-FAS 140 southeast of Eagle Creek	6.94
142	Independence	FAS 138 in Independence-FAS 123 west of Eola	6.38
144	Alsea	FA 2 at Waldport-FA 22 near Philomath	59.11
145	Eddyville-Blodgett	FA 22 near Blodgett-Nashville	7.57
146	Otis-Rose Lodge (Co. Rd.)	FA 2 at Otis-FA 23 at Rose Lodge	4.10
147	Salem-Oregon City (Part Co. Rd.)	U 280-003 in Salem-FA 41 at Oregon City	41.98
149	Schooner Creek (Co. Rd.)	FA 2 at Taft-Schooner Creek	2.57
150	Siletz-Orton (Co. Rd.)	FAS 196 at Siletz-Orton	8.00
151	Harlan-Burnt Woods (Co. Rd.)	Harlan-FA 22 at Burnt Woods	8.05
152	Yachats River (Co. Rd.)	FA 2 at Yachats-Yachats River	7.25
159	Salem-Brassel Corner (Co. Rd.)	U 280-123 in Salem-FAS 102 northwest of Woodburn	16.67
176	Independence-Salem (Co. Rd.)	FAS 193 in Independence-U 280-003 in Salem	10.62
190	Kings Valley	FA 22 near Wren-FAS 123 in Dallas	28.17
193	Granger (Co. Rd.)	FA 10 near Albany-FAS 138 and FAS 142 in Independence	18.39
196	Siletz	FA 22 near Toledo-FA 2 at Kernville	31.73
200	Monroe-Cheshire	FA 9 in Monroe-FA 25 at Cheshire	8.66
201	Cheshire-Hadleyville	FA 25 near Cheshire-Hadleyville	16.09
202	Corvallis-Eastside	FA 9 in Corvallis-FA 3 at Albany	10.19
205	Granger-Wells (Co. Rd.)	FA 10 at Granger-FAS 193 near Wells	5.33
206	Beaver Creek-Greenberry (Co. Rd.)	Beaver Creek-FA 9 near Greenberry	5.80
207	Dawson-Bellfountain (Co. Rd.)	Dawson-FA 9 near Monroe	6.78
208	Albany Airport	FA 37 near Albany-FA 3 at Albany Airport	1.07
210	Eugene-Harrisburg (Co. Rd.)	FA 3 in Eugene-FA 3 in Harrisburg	19.08
212	Lebanon-Crabtree Corner (Co. Rd.)	FA 37 in Lebanon-FAS 220 east of Crabtree	7.78
213	Brewster-Lacomb (Co. Rd.)	FAS 212 near Lebanon-Lacomb	6.60
214	Lebanon-Berlin (Co. Rd.)	FAS 212 near Lebanon-Berlin	9.07
215	Halsey-Sweet Home	FA 2 in Halsey-FA 37 in Sweet Home	21.51
216	Orleans-Lebanon (Co. Rd.)	FAS 202 at Orleans-FA 37 in Lebanon	15.15
217	Sweet Home-Foster (Co. Rd.)	FA 37 at Sweet Home-FA 37 at Foster	5.77
218	Holley-Rice School (Co. Rd.)	FAS 215 near Holley-Rice School	4.78
219	Junction City-Eugene	FA 3 in Eugene-FA 3 in Junction City	13.52
220	Albany-Lyons	FA 37 east of Albany-FAS 124 at Lyons	24.68
221	Creswell-Pleasant Hill	FA 3 at Creswell-FA 29 near Pleasant Hill	7.51

ARTICLE 9—Continued

F. A. S. No.	Name	Termini	Length in Miles
222	Springfield-Pleasant Hill	FA 29 near Pleasant Hill-FA 5 near Springfield	8.30
223	Fox Hollow	FA 3 near Walker-FA 3 in Eugene	15.50
225	Alsea-Deadwood	FA 25 near Swisshome-Paris	18.77
226	Canary (Co. Rd.)	FA 2 near Florence-Canary	5.35
227	Junction City-Lewis Ranch (Co. Rd.)	FA 3 in Junction City-Lewis Ranch	6.20
228	Eugene-Marcola (Co. Rd.)	FAS 210 near Eugene-Marcola	16.10
229	Eugene-Gillespie Corner (Co. Rd.)	FA 3 in Eugene-FAS 200 at Gillespie Corner	16.30
230	Jasper-Lowell (Co. Rd.)	FA 29 at Lowell-FAS 222 at Jasper	11.36
231	Cottage Grove-Culp Creek (Co. Rd.)	FA 3 in Cottage Grove-Culp Creek	16.36
232	Sutherlin-Elkton	FA 3 in Sutherlin-FA 20 at Elkton	25.74
233	Sutherlin	FAS 232 near Sutherlin-FA 3 near Sutherlin	1.69
234	Tiller-Trail	FA 3 at Canyonville-FAS 269 at Trail	49.59
236	West Diamond Lake	FAS 269 near Union Creek-M.P.	9.00
238	Walton-Eugene	Walton-FA 3 in Eugene	27.13
239	Yoncalla-Scotts Valley (Co. Rd.)	FA 3 near Yoncalla-Scotts Valley	8.09
240	Sutherlin-Nonpareil (Co. Rd.)	FA 3 in Sutherlin-Nonpareil	10.04
241	Roseburg-Cleveland (Co. Rd.)	U 270-003 in Roseburg-Cleveland	11.13
243	Azalea-Anchor (Co. Rd.)	FA 3 at Azalea-Anchor	6.30
244	Riddle (Co. Rd.)	FA 3 near Myrtle Creek-Riddle	2.83
245	Glendale (Co. Rd.)	FA 3 northeast of Glendale-Glendale	11.25
246	Empire-Coos Bay	FAS 263 near Empire-FA 2 in Coos Bay	3.55
247	Powers	Powers-FA 14 near Myrtle Point	18.62
248	Lakeside (Co. Rd.)	Lakeside-FA 2 near Lakeside	1.01
249	Jordan Point (Co. Rd.)	FA 2 at Coos Bay Bridge-Jordan Point	2.70
250	Coquille-Fairview (Co. Rd.)	State Highway No. 9 in Coquille-Fairview	9.01
251	Myrtle Point-Coquille (Co. Rd.)	FA 14 at Myrtle Point-FA 14 near Coquille	13.36
252	Myrtle Point-Gravelford (Co. Rd.)	FA 14 at Myrtle Point-Gravelford	8.17
253	North Umpqua (Co. Rd.)	U 270-003 in Roseburg-Rock Creek	21.61
255	Enegren Ferry-Delwood (Co. Rd.)	FAS 262 at Lillian Canal-Delwood	10.23
256	Port Orford	FA 2 at Port Orford-U. S. Coast Guard Station	0.79
257	Sixes-Dry Creek (Co. Rd.)	FA 2 at Sixes-County Road at Dry Creek	5.19
258	Gold Beach-Bagnall Ferry (Co. Rd.)	FA 2 at Gold Beach-Bagnall Ferry	4.78
259	North Side Chetco River (Co. Rd.)	FA 2 at Brookings-County Road near Mill Creek	5.80
260	Oregon Caves	FA 17 at Cave Junction-Oregon Caves National Monument	19.70
261	Rogue River Loop	FA 17 near Wilderville-FA 3 in Grants Pass	22.42
262	Coos River	FA 2 near Coos Bay-County Road near Allegany	19.03
263	Cape Arago	Cape Arago State Park-FA 2 in North Bend	14.25
264	Grants Pass-West (Co. Rd.)	FAS 261 West of Grants Pass-FAS 261 near Grants Pass	4.84
265	Merlin-Hugo (Co. Rd.)	FA 3 near Grants Pass-FA 3 near Hugo	11.61

ARTICLE 9—Continued

F. A. S. No.	Name	Termini	Length in Miles
266	Wilderville-Grants Pass (Co. Rd.)	FA 17 at Wilderville-FAS 280 near Grants Pass	9.76
267	Holland Loop (Co. Rd.)	FAS 260 near Cave Junction-FAS 260 north of Holland	7.96
268	Medford-Provolt	FAS 280 at Provolt-FA 3 in Medford	25.42
269	Crater Lake	FA 3 near Medford-Crater Lake National Park	66.55
271	Sams Valley	FA 3 in Gold Hill-FAS 269 near Trail	15.03
273	Medford-Sams Valley (Co. Rd.)	FA 3 near Medford-FAS 271 in Sams Valley	12.06
274	Jacksonville-Central Point (Co. Rd.)	FAS 268 in Jacksonville-FAS 269 north of Medford	9.54
276	Rogue River-Wimer (Co. Rd.)	FA 3 at Rogue River-County Road at Wimer	8.06
277	Dead Indian (Co. Rd.)	FA 15 near Ashland-County Road near Frog Creek	6.58
278	Phoenix-Voorhies (Co. Rd.)	FA 3 in Phoenix-FA 3 near Medford	3.00
280	Williams	County Road near Williams-FA 3 near Grants Pass	23.13
287	Butte Falls (Co. Rd.)	FAS 269 south of Trail-Butte Falls	15.67
288	Little Butte	FAS 269 in Eagle Point-Lakecreek	11.76
300	Odell	FAS 115 near Odell-FAS 356 near Van Horn	3.43
301	Schenck Corner-Van Horn (Co. Rd.)	FAS 300 near Odell-FAS 115 near Van Horn	1.92
302	Cider Mill-Rockford (Co. Rd.)	County Road near Oak Grove-FA 1 near Hood River	4.61
303	Windmaster Corner-Oak Grove (Co. Rd.)	FAS 302 in Oak Grove-FAS 356 near Hood River	2.10
305	Odell School-Fikes Crossing (Co. Rd.)	FAS 356 near Summit-FAS 300 near Odell	2.04
306	Dee-Lost Lake Road (Co. Rd.)	FAS 356 at Dee-County Road southwest of Dee	2.25
307	Sherars Bridge	FA 4 near Tygh Valley-FA 12 at Grass Valley	28.64
308	Shaniko-Fossil	FA 12 at Shaniko-FA 6 in Fossil	43.45
309	Mill Creek-The Dalles (Co. Rd.)	County Road near Mill Creek-FAS 365 in The Dalles	8.23
310	Dufur-Atkinson Ranch (Co. Rd.)	FA 4 at Dufur-FA 4 near Boyd	5.08
311	Pinehurst School-Tygh Valley (Co. Rd.)	County Road near Pinehurst School-FA 4 at Tygh Valley	7.37
312	Bakeoven Road (Co. Rd.)	FA 4 at Maupin-County Road east of Maupin	5.06
313	Rufus-Scott Canyon (Co. Rd.)	FA 1 at Rufus-Klondike Junction	2.91
316	Service Creek-Mitchell	FA 5 at Mitchell-FA 6 at Service Creek	24.85
317	Hardman	FAS 378 southwest of Heppner-County Road southeast of Hardman	14.74
318	Waterman-Spray (Co. Rd.)	County Road at Waterman-FA 6 at Spray	13.00
319	McKenzie-Bend	FA 4 near Bend-FA 5 near Sisters	18.54
320	O'Neil	FA 4 at Prineville Junction-FA 5 at Prineville	17.71

ARTICLE 9—Continued

F. A. S. No.	Name	Termini	Length in Miles
321	Crooked River	County Road southeast of Prineville-FA 5 in Prineville	21.50
322	Terrebonne-O'Neil (Co. Rd.)	FA 4 at Terrebonne-FAS 400 west of Prineville	4.86
324	Cline Falls	FAS 319 at Tumalo-FA 5 near Cline Falls	10.54
325	Tumalo-Deschutes (Part Co. Rd.)	FAS 324 at Tumalo-County Road at Deschutes	4.18
326	Redmond-Bend	FAS 319 near Bend-FA 4 at Redmond	13.26
327	Cloverdale-South (Co. Rd.)	FAS 319 near Sisters-FA 5 at Cloverdale	4.50
329	Gerkhing Corner-North (Co. Rd.)	FAS 319 northwest of Tumalo-FAS 319 at Tumalo	5.90
330	Carroll Acres-Southeast (Co. Rd.)	FA 4 near Bend-southeast to County Road	2.53
356	Hood River	FAS 115 near Parkdale-FA 1 in Hood River	17.28
365	Chenoweth Creek (Co. Rd.)	FA 1 in The Dalles-County Road near Chenoweth Creek	3.59
369	Petersburg-Fairbanks (Co. Rd.)	FA 4 near Petersburg-County Road at Fairbanks	5.92
378	Wasco-Heppner (Part Co. Rd.)	FA 1 near Sherman-FAS 439 at Heppner	99.14
385	Madras-Prineville	FA 5 in Prineville-FA 4 near Madras	26.39
390	Fossil-Kinzua (Co. Rd.)	FA 6 near Fossil-County Road near Kinzua	7.06
395	Lower Bridge-Terrebonne (Co. Rd.)	County Road near Lower Bridge-FA 4 near Terrebonne	6.28
397	Bend-Butler Ranch (Part Co. Rd.)	FA 21 in Bend-FAS 398 east of Bend	8.33
398	Alfalfa (Part Co. Rd.)	FA 21 near Bend-County Road near Alfalfa	10.35
400	Long Pine School (Co. Rd.)	FAS 320 near O'Neil-one mile south of Jefferson County line	4.20
401	Prineville-McKay Creek (Co. Rd.)	FA 5 in Prineville-Upper McKay Creek	9.00
402	Prineville-Davis Ranch	FAS 403-FA 5 near Prineville	16.45
403	Paulina	FAS 402-Paulina	39.57
404	Powell Butte	FA 5 west of Powell Butte-FAS 542 south of Powell Butte	5.72
405	Lakeview-Burns	FA 16 at Valley Falls-FA 21 at Okerman Ranch	90.10
406	Warner Valley	FA 16 near Lakeview-Plush	45.97
407	West Side (Co. Rd.)	County Road near West Side-FA 410 west of Lakeview	8.05
408	Cottonwood Creek (Co. Rd.)	FAS 410 west of Lakeview-FAS 407	6.75
410	Klamath Falls-Lakeview	FA 4 in Klamath Falls-FA 16 in Lakeview	95.81
411	Maddox Corner-Thomas Creek (Co. Rd.)	FAS 410 west of Lakeview-north to Thomas Creek	5.29
414	Fort Rock (Co. Rd.)	FA 16 west of Fort Rock-Fort Rock	6.73
416	Dairy-Bonanza	FAS 410 at Dairy-FAS 430 at Bonanza	6.97
417	Bonanza-Malin (Co. Rd.)	FAS 419 west of Malin-FAS 416 in Bonanza	14.88
418	Bonanza-Lorenz Mill (Co. Rd.)	FAS 416 in Bonanza-FAS 410 at old Lorenz Mill	7.80

ARTICLE 9—Continued

F. A. S. No.	Name	Termini	Length in Miles
419	Klamath Falls-Malin	FAS 410 east of Klamath Falls-Oregon-California line	27.09
420	Klamath Lake	FAS 4 in Klamath Falls-FAS 541 at Fort Klamath	48.07
421	Chiloquin-Southwest	FAS 541 near Lobert-FAS 424 at Chiloquin	2.96
422	Malone (Co. Rd.)	FAS 419 east of Merrill-Oregon-California line	1.75
423	Hatfield	FAS 419 east of Merrill-Oregon-California line	2.51
424	Klamath Agency-Chiloquin	FAS 541 south of Klamath Agency-Chiloquin	4.42
425	Modoc Point	FA 4 at Modoc Point-FAS 541 south of Klamath Agency	12.90
427	Midland	FA 33 north of Midland-FAS 410 at Altamont	5.79
428	Lower Klamath	FA 33 south of Midland-FAS 419 west of Dehlinger	7.02
429	Sprague River (Co. Rd.)	Sprague River-FAS 410 west of Beatty	9.30
430	Bonanza-Langell Valley (Co. Rd.)	FAS 417 south of Bonanza-Lorella-FAS 416 in Bonanza	19.20
431	Olene-Poe Valley (Co. Rd.)	FAS 410 near Olene-FAS 417 south of Bonanza	9.62
432	Keno-Worden (Co. Rd.)	FA 33 near Worden-FA 15 at Keno	7.67
433	Hermiston	FAS 443 west of Echo-FAS 462 in Hermiston	10.48
434	Altamont-Mock Corner (Co. Rd.)	FAS 428, 3 miles west of Dehlinger-FAS 427 south of Klamath Falls	6.08
437	Kimberly-Long Creek (Part Co. Rd.)	FA 6 at Kimberly-3 miles east of Malheur National Forest Boundary	45.32
439	Heppner	FA 1 at Heppner Junction-FA 30 at Nye	84.37
440	Mikkalo (Co. Rd.)	FA 6 near Olex-Mikkalo	2.22
441	Lonerock (Co. Rd.)	Lonerock-FAS 378 east of Condon	16.49
443	Lexington-Echo	FAS 439 at Lexington-FA 1 east of Echo	39.36
444	Morgan Ranch-Ione (Co. Rd.)	Morgan Ranch-FAS 439 at Ione	9.31
447	John Day-Burns	FA 31 north of Burns-FA 5 in John Day	68.11
448	Austin Spur	FA 5 south of Austin-Austin	2.69
449	Beech Creek	FA 5 at Mt. Vernon-FA 30 northwest of John Day	5.35
450	Frenchglen	FAS 457 east of Burns-Frenchglen	62.00
452	Prairie City-Blue Mountain Springs (Co. Rd.)	FA 5 in Prairie City-Blue Mountain Springs	11.85
453	Logdell (Co. Rd.)	Logdell-FAS 447 north of Seneca	8.01
454	Hermiston-Cold Springs	FAS 462 in Hermiston-FA 18 near Cold Springs	7.38
455	Rome-Princeton	FAS 456 north of Princeton-FAS 513 near Rome	61.71
456	Diamond Valley (Part Co. Rd.)	FAS 457 near Crane-FAS 450 at Grain Camp	48.06
457	Burns-Crane	FA 21 in Burns-Crane	28.91
458	Drewsey (Co. Rd.)	FA 31 south of Drewsey-Drewsey	2.60
459	Silvies River (Co. Rd.)	FA 31 in Burns-Silvies River	4.48
461	Pendleton-Cold Springs	FA 1 in Pendleton-FA 18 at Cold Springs	30.88

ARTICLE 9—Continued

F. A. S. No.	Name	Termini	Length in Miles
462	Stanfield-McNary Dam	FA 1 south of Stanfield-FA 18 near McNary Dam	11.64
463	Ordnance Depot	FA 1 south of Ordnance-Ordnance Depot	0.41
464	Umapine	FA 19 north of Milton-Freewater-Oregon-Washington line north of Umapine	7.25
465	Athena-West	FA 19 in Athena-FAS 467, 2 miles south of Helix	7.98
466	Myrick	FAS 461 southeast of Holdman-FAS 467, 3 miles south of Helix	8.46
467	Havana-Stanton (Part Co. Rd.)	Half mile north FA 19 at Havana-Stanton	14.43
469	Weston-Elgin	FA 19 at Weston-FA 7 at Elgin	41.39
470	Stanfield-Pendleton	FA 1 south of Stanfield-FA 1 near Pendleton	24.65
471	Milton-South Fork Walla Walla River (Co. Rd.)	FA 19 in Milton-Power Plant	6.77
472	Cayuse-Adams (Co. Rd.)	FAS 473 at Cayuse-FA 19 at Adams	15.29
473	Mission-Adams (Co. Rd.)	FA 1 near Mission-FA 19 at Adams	12.93
474	Thorn Hollow-Athena (Co. Rd.)	FAS 472 southeast of Adams-FA 19 at Athena	8.02
475	Thompson Ranch-Mission (Co. Rd.)	Thompson Ranch-FA 1 near Mission	5.90
477	Starkey	Starkey-FA 1 near Hilgard	17.00
478	Mt. Glen (Co. Rd.)	FA 7 in La Grande-FAS 481 north of Island City	7.42
479	Lower Cove (Co. Rd.)	FA 7 south of Alicel-Grande Ronde River	5.88
480	Enterprise-Wallowa Lake	FA 7 in Enterprise-south end Wallowa Lake	12.60
481	Island City-Imbler (Co. Rd.)	FA 7 at Island City-Summerville-FA 7 at Imbler	20.55
482	Little Sheep Creek	FAS 480 in Joseph-Imnaha	30.42
483	Cove	FAS 7 at Island City-Cove-FA 1 at Union	22.16
484	Alder Slope (Co. Rd.)	County Road south of Enterprise-FAS 480 in Enterprise	4.03
485	Zumwalt (Co. Rd.)	FAS 480 north of Joseph-Crow Creek Road Junction	5.28
486	Medical Springs	FAS 505 near Baker-FA 1 in Union	42.67
487	Whiskey Creek (Co. Rd.)	FA 7 in Wallowa-Junction with County Road northeast of Wallowa	7.19
488	North Powder River (Co. Rd.)	FAS 503 northwest of Haines-FA 1 in North Powder	4.90
489	Whiskey Creek-Lostine (Co. Rd.)	FAS 487 east of Wallowa-FA 7 in Lostine	7.88
490	Flora	FA 7 in Enterprise-Oregon-Washington line	43.77
491	Wallowa-Johnson Ranch (Co. Rd.)	FA 7 in Wallowa-FA 7 northwest of Wallowa	3.46
497	Hurricane Creek (Co. Rd.)	FAS 480 in Joseph-FAS 480 in Enterprise	7.38
500	Robinette	FAS 505 east of Richland-Brownlee	11.00
501	Baker-Unity	FA 5 north of Unity-FA 1 in Baker	46.10
502	Sumpter	Sumpter-FAS 501 at Salisbury	19.18
503	Haines-Anthony	FA 1 near Haines-Anthony Creek	11.30
504	Pine Creek	FAS 505 in Halfway-Long Branch Creek	3.72
505	Baker-Corucopia	FA 1 in Baker-Corucopia	71.41

ARTICLE 9—Continued

F. A. S. No.	Name	Termini	Length in Miles
506	Baker-Pine Creek-Wingville (Co. Rd.)	FA 1 in Baker-Pine Creek-Wingville-FA 1 northwest of Baker	13.44
507	Rock Creek (Co. Rd.)	FA 1 in Haines-Rock Creek-FAS 503 west of Haines	9.20
508	Muddy Creek (Co. Rd.)	FAS 503 northwest of Haines-FAS 507 north of Rock Creek	3.83
509	Keating (Co. Rd.)	FAS 505 south of Keating-Keating	3.36
510	New Bridge (Co. Rd.)	FAS 505 at Richland-New Bridge	2.41
511	Richland-South (Co. Rd.)	FAS 505 at Richland-Daly Creek	3.54
512	Halfway-North (Co. Rd.)	FAS 505 at Halfway-East Pine Creek	3.34
513	I. O. N.	Oregon-Nevada line at McDermitt-Oregon-Idaho line north of Jordan Valley	118.13
514	Cairo-Nyssa	Oregon-Idaho line at Nyssa-FA 5 at Cairo	8.64
515	East Cow Hollow (Co. Rd.)	FAS 518 at Owyhee-East Cow Hollow	7.42
516	Weiser Spur	FA 1 south of Weiser-Oregon-Idaho line at Weiser	1.99
517	Payette Spur	Oregon-Idaho line at Payette-FA 1 north of Payette	1.67
518	Nyssa-Homedale	Idaho line 7 miles south of Adrian-FAS 514 in Nyssa	22.54
519	Graham Boulevard	FA 31 south of Hope-FA 31 in Vale	10.72
520	Adrian-Parma	FAS 518 near Adrian east to Oregon-Idaho line	2.77
523	Harper Loop (Co. Rd.)	FAS 525 at Harper-FAS 525 south of Harper	6.20
524	Jordan Valley	FAS 513 west of Jordan Valley-FAS 513 north of Jordan Valley	10.43
525	Harper-Little Valley (Co. Rd.)	FA 31 south of Harper-FA 31 southeast of Little Valley	8.93
527	Cox Corner-Ontario (Co. Rd.)	FA 5 west of Cairo-FA 5 near Ontario	6.76
528	Morgan Avenue-Ontario (Co. Rd.)	FA 514 south of Cairo-FA 5 in Ontario	6.51
529	Nyssa-Morgan Avenue (Co. Rd.)	FAS 514 at Nyssa-Morgan Avenue southwest of Cairo	6.10
530	Enterprise Avenue (Co. Rd.)	FAS 515 in East Cow Hollow-FAS 518 south of Nyssa	3.90
532	Oregon Trail School-Lapin Corner (Co. Rd.)	FAS 515 in Cow Hollow-FAS 518 near Kingman	2.30
533	Rock Spring Canyon (Co. Rd.)	Road Junction north of Mitchell Butte FAS 515 west of Owyhee	4.00
535	Oregon Slope (Co. Rd.)	FA 1 5 miles north of Payette Junction-FA 1 3 miles north of Payette Junction	3.70
536	Ironside-South (Co. Rd.)	FA 5 at Ironside-South Fork Willow Creek	3.67
537	Juntura-Beulah (Co. Rd.)	FA 31 at Juntura-Beulah	14.34
539	Sun Mountain	FA 4 east of Crater Lake-FAS 541 near Ft. Klamath	26.98
540	Adrian-Idaho	FAS 520 east of Adrian-southeast to Oregon-Idaho line	4.42
541	East Crater Lake	Crater Lake National Park-FA 4 near Lobert	20.15
542	Butler Ranch-Powell Butte	FAS 397 at Butler Ranch-FAS 404 south of Pilot Butte	9.48
544	Island City-South (Co. Rd.)	FA 7 in Island City south to FA 1	2.90
546	Gateway-Agency Plains (Co. Rd.)	FA 44 northwest of Madras-FA 4 southeast of Gateway	13.90

ARTICLE 9—Continued

F. A. S. No.	Name	Termini	Length in Miles
547	Culver-Juniper Butte (Co. Rd.)	FAS 549 at Culver-FA 4 near Juniper Butte	8.60
548	Metolius-Culver (Co. Rd.)	FAS 549 near Metolius-FAS 547 west of Culver	6.00
549	Culver	FA 4 at Madras-FA 4 southeast of Culver	11.64
550	Seven Devils (Co. Rd.)	FA 2 in Bandon-Bullards	3.10
551	Wilson River Loop (Co. Rd.)	Road Junction near the Wilson River south to FA 35 at the Fair Grounds	1.47
552	Rhea Creek (Co. Rd.)	FAS 439 at Jordan-FAS 378 near Rhea Creek	18.70
601	Nehalem	FA 2 in Astoria-FA 27 near Buxton	74.86
602	Warrenton-Ft. Stevens	FA 2 in Warrenton-Ft. Stevens	4.53
603	Fishhawk Falls	FA 27 near Elsie-FAS 601 west of Jewell	5.86
604	Mist-Clatskanie	FAS 601 at Mist-FA 1 at Clatskanie	11.90
605	Warrenton-Chapman Street	FA 2 in Warrenton-FAS 602 in Warrenton	1.62
606	Elsie-Jewell (Co. Rd.)	FA 27 near Elsie-FAS 601 at Jewell	8.91
608	Youngs Bay-Melville (Co. Rd.)	Melville-FA 2 near Astoria	7.92
609	Pittsburg-Scappoose (Co. Rd.)	FAS 601 at Pittsburg-FA 1 at Scappoose	19.79
610	Ingils-Mayger	FA 1 near Quincy-Mayger	4.64
612	Treharne-Sunset Camp (Co. Rd.)	FA 27 at Sunset Camp-FAS 601 at Treharne	10.50
614	Little Nestucca	FA 2 near Cloverdale-FA 11 at Dolph	9.54
615	Miami-Barnsdale School (Co. Rd.)	FA 2 near Garibaldi-Barnsdale	7.07
616	Netarts	Oceanside-FA 2 at Tillamook	9.15
618	Hemlock-Sand Lake (Co. Rd.)	Sand Lake-FA 2 at Hemlock	5.52
619	Peltz Corner-Trask River (Co. Rd.)	FA 2 near Tillamook-FAS 620	2.00
620	Fairview-Clements Corner (Co. Rd.)	FA 35 east of Tillamook-FAS 619	2.80
621	Coast Highway-Pacific City-Woods (Co. Rd.)	FA 2 south of Cloverdale-Woods	3.57
622	Beaverton-Aurora	FA 3 at Aurora-FAS 625 at Berverton	20.81
623	Nehalem	FA 27 near Davies-FA 32 at Forest Grove	9.75
624	Forest Grove-Balm Grove (Co. Rd.)	FA 32 at Forest Grove-FA 35 near Gales Creek	10.65
625	Beaverton-Hillsdale	FA 32 at Beaverton-U 260-009 in Portland	6.72
626	Farmington	FAS 650 south of Hillsboro-FAS 622 in Beaverton	9.89
627	Scholls	FAS 650 at Scholls-FAS 625 near Beaverton	12.40
629	Hillsboro-North Plains-Shadybrook (Co. Rd.)	FA 32 in Hillsboro-Shadybrook	8.55
631	Cornelius-Blooming (Co. Rd.)	1 mile south of Blooming-FA 32 at Cornelius	3.70
632	Hillsboro-Cornelius Pass (Co. Rd.)	FA 32 in Hillsboro-FA 1 near Burlington	13.70
633	Hillsboro-Farmington-North Scholls (Co. Rd.)	FAS 627 near north Scholls-FA 32 near Hillsboro	8.05
634	Six Corners-Sherwood-Tualatin (Co. Rd.)	FA 9 at Six Corners-FAS 622 at Tualatin	5.12
635	Cedar Mill (Co. Rd.)	FA 27 near Orenco-U 260-001 in Portland	8.56
637	Sun Dial	FA 1 east of Fairview-Aluminum Plant	1.25
638	N. E. Glisan Street (Co. Rd.)	U-260-041 in Portland-Base Line Road south of Troutdale	9.70
639	S. E. Foster Road (Co. Rd.)	FAS 129 at Damascus-U 260-041 in Portland	8.93
643	Sauvies Island (West Side) (Co. Rd.)	FA 1 south of Burlington-FAS 644 east of Burlington	2.50
644	Sauvies Island (Central) (Co. Rd.)	FAS 643 east of Burlington-FAS 643 south of Burlington	10.40
645	Sauvies Island (Oak Island) (Co. Rd.)	FAS 644 east of Burlington-north end Little Sturgeon Lake	3.06
650	Hillsboro-Newberg	FA 9 in Newberg-FA 32 in Hillsboro	20.35
		Total mileage on Secondary Federal-Aid Highway System	4,550.18

ARTICLE 10

Oregon Forest Highway System

Forest Road No.	State No.	Name	Termini	Length in Miles
1	32	Three Rivers	Hebo-East Forest Boundary	13.9
2	39	Salmon River	Oregon Coast Highway-Polk County Line	13.7
3	9	Oregon Coast	Neskowin-Siletz River	22.8
4	181	Siletz	Oregon Coast Highway-Forest Boundary	6.0
5	9	Oregon Coast	Yaquina Bay-Umpqua River	68.7
6	27	Alsea	Waldport-Benton County Line	28.4
7	34	Siuslaw	Oregon Coast Highway-Blachly	45.1
8	45	Umpqua	Reedsport-Scottsburg	15.6
9	9	Oregon Coast	Douglas County Line-Hauser	9.7
10	9	Oregon Coast	Port Orford-Gold Beach	31.3
11	25	Redwood	O'Brien Schoolhouse-State Line	5.4
12	25	Redwood	Summit Hayes Hill-Love Station	2.0
13	38	Oregon Caves	3 miles west of Forest Boundary to Caves	11.5
14	....	Applegate (county road)	Ruch-Watkins	17.0
15	1	Pacific	Canyonville-2¾ miles south of Forest Boundary	11.0
16	230	Tiller-Trail	Tiller to Trail	26.3
17	22	Crater Lake	Trail-Park Boundary	44.0
18	22	Crater Lake	Park Bdry. to Sun Mountain Highway	7.7
19	*	Dalles-California	Crescent to Crater Lake Highway	57.8
20	424	Sand Creek	Sun Mountain Highway-Park Boundary	4.3
21	18	Willamette	Lowell to Dalles-California Highway	73.3
22	15	McKenzie	Blue River to Sisters	51.2
23	16	Santiam	1 mile east of Foster to Sisters	69.5
24	162	North Santiam	Niagara-Santiam Highway	44.6
25	26	Mount Hood	West Forest Boundary to Wapinitia Jct.	15.4
26	44	Wapinitia	Mt. Hood Highway to 1 mile north of Wapinitia	32.6
27	41	Ochoco	West Forest Boundary to North Forest Boundary	19.6
28	2	Columbia River	West Forest Boundary to East Forest Boundary	27.3
29	19	Fremont	West Forest Boundary to East Forest Boundary	16.2
30	20	Klamath Falls-Lakeview	West Forest Boundary to East Forest Boundary	29.4
31	19	Fremont	4 miles south of Valley Falls to 6 miles north of Lakeview	13.0
32	321	Heppner-Spray	Mouth of Chapin Creek to John Day Highway	26.3
33	28	Pendleton-John Day	2½ miles northwest of Albee to Range	30.7
34	28	Pendleton-John Day	Long Creek-South Forest Boundary	20.4
35	**	John Day-Burns	John Day-Burns	70.2
36	5	John Day	Prairie City-Unity	42.6
37	330	Weston-Elgin	McDougall's Camp to Summerville-Elgin Road	23.2
38	11	Enterprise-Lewiston	State Line to South Forest Boundary	30.3
39	350	Little Sheep Creek	West Forest Boundary to Imnaha	8.8
40	413	Baker-Cornucopia	Carson to Corucopia	5.0
41	....	Loop-Dalles (county road)	Mt. Hood Highway to East Forest Boundary	15.0
42	53	Warm Springs	Wapinitia Highway to Forest Boundary	6.9
43	†	Diamond Lake	Union Creek to Dalles-California Highway via Diamond Lake	38.9

Continued

Forest Road No.	State No.	Name	Termini	Length in Miles
44	‡	Williams Creek	Provolt to Oregon Caves Highway	20.0
45	9	Oregon Coast	North Forest Boundary to South Forest Boundary between Beaver and Hebo	1.1
46	§	Cascade Lakes	North Boundary of Crater Lake Park to Bend	101.0
47	....	North Umpqua	Rock Creek to Cascade Lakes Highway	60.0
48	421	Klamath Lake-West Side	Seven Mile Creek to Forest Boundary southeast of Odessa Creek	20.0
49	26	Mount Hood	Wapinitia Junction-North Forest Boundary	21.5
50	173	Timberline	Mt. Hood Highway Junction to Timberline Lodge	5.6
51	....	Belknap Springs	McKenzie Highway Junction near Belknap Springs to Santiam Highway	21.0
52	....	Ukiah-Starkey	West Forest Boundary to East Forest Boundary	20.4
			Total mileage on Forest Highway System	1,423.2
			Mileage on State System	1,195.2

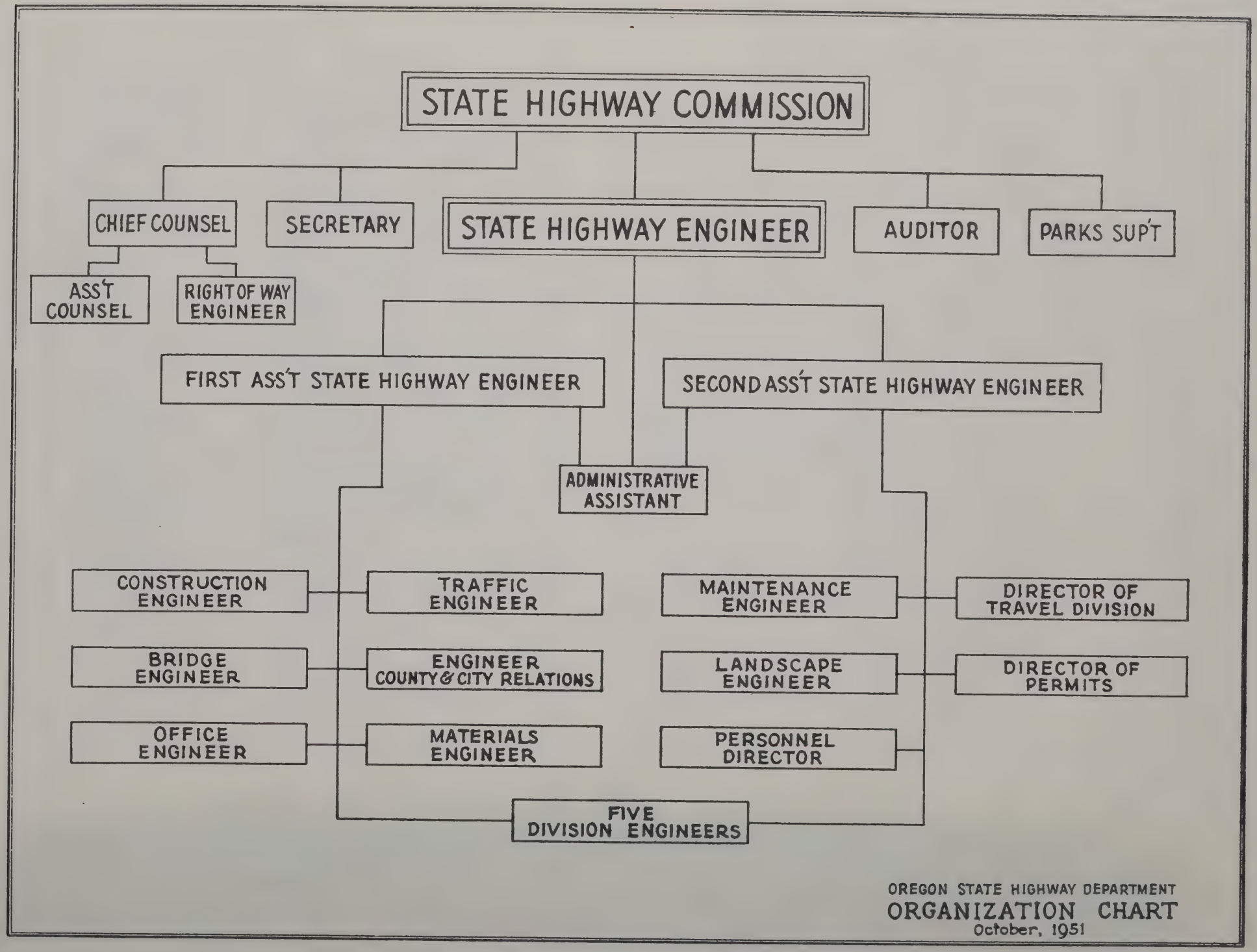
* Includes 30.8 miles on Highway 4 and 27.0 miles on Highway 428.

** Includes 67.7 miles on Highway 48 and 2.5 miles on Highway 7.

† State Secondary Highways 233 and 425.

‡ Includes 9.3 miles on State Secondary Highway 261.

§ Includes 17.1 miles on State Secondary Highway 232 and 372.


STATE HIGHWAY COMMISSION
CHIEF COUNSEL
SECRETARY
STATE HIGHWAY ENGINEER
AUDITOR
PARKS SUP'T
ASS'T COUNSEL
RIGHT OF WAY ENGINEER
FIRST ASS'T STATE HIGHWAY ENGINEER
SECOND ASS'T STATE HIGHWAY ENGINEER
ADMINISTRATIVE ASSISTANT
CONSTRUCTION ENGINEER
TRAFFIC ENGINEER
MAINTENANCE ENGINEER
DIRECTOR OF TRAVEL DIVISION
BRIDGE ENGINEER
ENGINEER COUNTY & CITY RELATIONS
LANDSCAPE ENGINEER
DIRECTOR OF PERMITS
OFFICE ENGINEER
MATERIALS ENGINEER
PERSONNEL DIRECTOR
FIVE DIVISION ENGINEERS
OREGON STATE HIGHWAY DEPARTMENT
ORGANIZATION CHART
October, 1951

Article 12—Construction Engineer

(a) Is a staff assistant to the State Highway Engineer and supervises all matters pertaining to the location and construction of all state and federal highways under jurisdiction of the State Highway Commission, including any collateral work being built by contract, such as roadside improvement and production of materials. He is responsible for proper performance and progress on all projects undertaken; for advancement and application of improved methods of construction; and for correlation of field practice with research developments.

(b) Assistants to the Construction Engineer:

1. Assistant Construction Engineer, who has general supervision of all matters assigned him by the Construction Engineer, and acts for the Construction Engineer in his absence.
2. Assistant Construction Engineer, who supervises and is in charge of the paving construction, with particular reference to geology and soil sections.
3. Chief Location Engineer, who supervises location in rural areas, Lambert's system of projection and the establishment of level lines.
4. Assistant Chief Locating Engineer, who supervises location in urban areas and the design of traffic interchanges.
5. Construction Office Engineer, approves all minor construction accounts, and handles all office work of the Construction Engineer.
6. Cost Analyst, who supervises the procurement and recording of contractor's costs and furnishes data on which estimates of costs are based.

Article 13—Division Engineer

The Division Engineer is an executive officer of the State Highway Department for the portion of the state to which he has been assigned. His duties are to coordinate and supervise the various activities pertaining to the location, construction and maintenance of the state highways in his division.

He reports directly to the Construction Engineer on all matters pertaining to road location and construction; to the Bridge Engineer on all matters pertaining to bridge construction; and to the Maintenance Engineer on all matters pertaining to maintenance of state highways.

He shall keep in constant touch with the construction needs and activities of his division. The Division Engineer should keep abreast of the latest construction methods and best engineering practice, and these features should always be incorporated in new work.

In addition to submitting routine reports and programs, he will make such other recommendations from time to time, with respect to the work in progress, or to proposed projects, as he may deem expedient or consider necessary.

The Division Engineer shall make a preliminary draft of the specifications for each project about to be contracted. These should be completely prepared in a manner customary to the Department; such a draft being accompanied by a report giving the reason for any change in the standard provisions and for any unusual provisions which it is desired to have incorporated therein. This draft of the specifications shall be submitted through the Construction Engineer to the State Highway Office Engineer for final drafting.

Article 14—Assistant Division Engineer

The Assistant Division Engineer is an executive officer of the State Highway Department for the portion of the state to which he has been assigned.

His position is designed to relieve the Division Engineer as much as possible of the numerous routine items of business, and it is intended that the Division Engineer shall delegate to his Assistant such duties, obligations and affairs of the division as will best serve the functions of that office.

It is *not* intended to continue to require the Division Engineer's signature on all the various documents, correspondence and papers which come within the scope of his work. Therefore, the signature of the Assistant Division Engineer will be honored on all inter-departmental papers, time reports and estimates without countersigning by the Division head.

Article 15—Resident Engineer

Under the direction of the Division Engineer and Assistant Division Engineer a Resident Engineer shall have immediate charge of location or construction, including one or more projects.

He will be held responsible for the activities and efficiency of his subordinates and for the satisfactory prosecution of the work under his supervision.

It is his responsibility to stake a project completely and see that the contractor is informed

of the meaning of all stakes. It is also his duty to know that all materials used meet controlling specifications and that the finished project meets alignment, grade and quantity requirements of the contract. The duties of the Resident Engineer include, (1) to establish lines and grades necessary to lay out the work; (2) to interpret and explain the plans and specifications, eliminate conflicts, and settle disputes which arise during execution of the contract; (3) to inspect construction details and materials for quality of workmanship and conformance with plans and specifications; and (4) to measure and compute quantities and prepare estimates for payments to the contractor. He shall have no authority to change plans and specifications, but shall keep in close contact with the work so that if changes are necessary, proper authority can be promptly obtained through the Division Engineer.

He will be held responsible for the accuracy of all notes and records. He shall see that all required reports are promptly furnished to Division and Headquarters offices.

Each Resident Engineer shall keep a diary in which matters of importance regarding his work shall be entered daily.

The closest cooperation is desired with the engineers and other employees in the field; and suggestions or criticism in regard to faulty design, or as to methods of procedure, will be welcomed and given attentive consideration. In offering suggestions to the Construction Department, the Resident Engineer or other employee should refer them in written form to the Division Engineer who will pass upon them and transmit them to Department Headquarters.

The Resident Engineer's relations with the public, contractor and local officials should be courteous, firm, business-like and governed by common sense. He should on all occasions keep in mind that he is a representative of the State Highway Department, engaged in the supervision of public work, and should, therefore, carefully avoid taking sides in local disputes or controversies, as such action on his part might be interpreted as being the attitude of the Department and tend to create ill will toward it. All statements of plans or policies are issued by the State Highway Commission or the executive officers at division or general headquarters. Field engineers are instructed to tactfully refer inquiries of this sort to the division headquarters. All matters of major importance shall be referred by the divisional headquarters to the general headquarters.

The Resident Engineer should recognize the fact that on Federal Aid Projects a part of the funds expended are being made available through the Bureau of Public Roads. The engineer should consult freely with the representatives of the B.P.R. and feel free to discuss all matters pertaining to the work. When it is desirable to institute changes in design, the Resident Engineer should advise the B.P.R. inspector at the first opportunity explaining the reasons for the proposed change in detail.

In dealing with people along the highway, the Resident Engineer must endeavor to maintain friendly relations. Frequently requests will be made to which he will be unable to comply, without committing the Department to some action which might be contrary to its policy and might not be approved. In such cases field engineers are to take pains not to offend people making improper requests, but courteously refer them to his superior officer. It is well that the Resident Enginer should become acquainted with owners along the highway and find out their problems and plans in relation to the contemplated improvement. A friendly discussion and understanding in such cases will often avoid later ill feeling and possible expensive litigation.

Article 16—Efficiency

In any organization as large and diverse in its activities as is the State Highway Department, every opportunity should be taken to reduce expenses without impairing efficiency. Long distance telephone should not be used when letter mail will serve the purpose. Daily mail should be concentrated in one envelope when submitted to the same office. Electric lights should be turned off when not in use. Tools and apparatus of all kinds must be kept clean, properly serviced and adjusted and should not be discarded as long as they remain reasonably serviceable.

It is essential that motorized equipment be stored, when not in use, where it will be protected against the weather and theft. Arrangements should be made for storage at reasonable rates.

Equipment shall be stored in private garages or other private storage *only* by permission of the Board of Control.

The day's work should always be planned so as to avoid all possible duplication of effort and to eliminate lost motion.

To attempt to do a certain job without sufficient force always results in inefficiency and increased costs, but to keep a larger force on the job than is really necessary is still more inefficient and costly. When a job reaches the point where a smaller number of men can be used without impairing efficiency, the surplus men should be transferred to other work or laid off. (See Section 4, Article 4, Re: Transfer and Release of Employees.)

The man on the ground who is in close contact with the work is frequently able to make valuable suggestions to his immediate superior as to economies that can be effected and improvements that can be made in methods, equipment, etc., and these suggestions are always welcome.

Article 17—Office Quarters

The practice of combining the office and living quarters, that is, both being in the same room or house, is not to be tolerated. Requests for office quarters must be approved by the Division Engineer.

Article 18—Report Address to Headquarters

The Resident Engineer assigned to take charge of a project shall, as soon as he has established his new headquarters, report to his Division Engineer his office location, post office, telephone or telegraph address; also the location of the nearest express and freight office.

He should leave his name and address at the telephone, telegraph, post office, freight and express offices, and be sure that they understand where he can be reached. When a resident engineer moves from one project to another he should leave his forwarding address with the local post office.

Article 19—Correspondence

Resident Engineers are to take up all matters of importance with their Division Engineer, who in turn will bring the matter to the attention of the Construction Engineer, if necessary.

All correspondence, telegrams, freight and express packages for the general office shall be addressed to the head of the particular department in each case, with a copy of the correspondence, telegrams, etc., to the State Highway Engineer, and copies to the heads of all other departments affected.

To facilitate filing, each letter should cover but one subject or refer to one section or project only.

Copies of all correspondence, reports, time reports, expense accounts, invoices, etc., should be retained by the employee for his own records.

All outside correspondence pertaining to the work of the Engineering Department must pass over the desk of the State Highway Engineer or the Assistant State Highway Engineer, and go out over their personal signatures. This rule pertains to correspondence with the Bureau of Public Roads, with governmental and state agences, with railroad companies and corporations and, in fact, to all correspondence except inter-departmental correspondence and such other routine matters as may be specifically delegated to the various department heads. The only correspondence which is exempt from the above ruling will be that between the staff officers or department heads and their subordinates, or contractors working under their immediate supervision.

Copies of instructions written by the Resident Engineer to the contractor shall be sent to the Division Engineer.

Article 20—Telephone and Telegraph

Request for telephone installation shall be made through the Division Engineer to the Construction Engineer.

The long distance telephone should be used only in cases of extreme urgency where the saving in time over letter mail is of sufficient importance to the State to fully warrant the expense of the call. Attention should be given also to making telephone conversations as brief as possible, and to avoiding extension of conversations into discussions of nonessential matters.

Article 21—Employee to Leave an Itinerary List

Employees who are required to travel shall leave at their headquarters an itinerary list showing dates, and if possible the names of the hotels at which stops will be made.

Article 22—Political Activities of Employees

The following excerpts from the State Civil Service Act regarding participation in political activities by state employes are believed to be

explanatory and are quoted to clarify any possible misconception which may exist:

> Section 29. No employe of any division or the commission shall use his official authority or influence to further the cause of any political party or candidate for nomination or election to public office. No person shall solicit from any employe of any division or the commission any money, influence, service or other valuable thing to further the cause of any political party or candidate for nomination or election to public office. No employe of any division or of the commission shall seek or accept nomination, election or appointment as an officer of a political party, club or organization, or serve as a member of a committee of any such club or organization, or be a candidate for a political office.
>
> Section 27. A state officer or employe who shall fail to comply with any provision of this act or of any rule, regulation or order thereunder shall be subject to all penalties and remedies now or hereafter provided by law for the failure of a public officer or employe to do an act required of him by law. The commission may maintain such action or proceeding at law or in equity as it considers necessary or appropriate to secure compliance with this act and its rules and orders thereunder.
>
> Section 31. Any person who wilfully violates any provision of this act or of the rules shall be guilty of a misdemeanor, and shall, upon conviction, be punished by a fine of not more than five hundred dollars ($500) or by imprisonment in the county jail for a term not exceeding one year, or by both such fine and imprisonment.
>
> Any person who is convicted of a misdemeanor under this act shall, for a period of five years, be ineligible for appointment to or employment in a position in the state service, and if he is an officer or employe of the state, shall be deemed guilty of malfeasance in office and shall be subject to forfeit of his office or position.

If any classified employe is found to be in violation of the above provisions and continues such violation, the State Civil Service Commission cannot certify any pay roll voucher containing salary payment authorization for such person.

Article 23—Employees to Refrain from Use of Alcoholic Drinks

(a) There shall be no drinking of alcoholic liquor of any kind during working hours.

(b) There shall be no drinking of alcoholic liquor at any time, the effects of which are apparent or detectable during working hours.

Article 24—Safety

Many personal injuries show that there is a lack of supervision of the crew, lack of planning of the work, lack of training of the men in safe working practices and lack of thinking on the part of the men. Remember—safety is everybody's business. The cost of safety—just a thought.

Men on survey crews who are not skilled in the handling of small tools, such as double-bitted axes, machetes, etc., shall be given special instructions, and any unsafe practices shall be corrected at once when observed by the chief of party.

All survey crews must use warning signs whenever they are working on the roadway and use flagmen in addition when working on curves or in other dangerous places. These signs shall be taken down during the noon hour so the effect of the sign will not be lost.

The riding on fenders and running boards on survey vehicles is a very dangerous practice and must be discouraged.

The best qualified drivers on the crew shall be used to drive station wagons and cars when transporting survey crews, and under no circumstances shall men under 18 years of age be allowed to operate equipment.

Cars shall not be parked partly on the pavement on construction jobs when it is possible to get them completely off the pavement by going a short distance ahead.

More thought shall be given to parking on jobs where heavy equipment is being used, as this not only interferes with the contractor, but there is also the danger of getting our equipment damaged.

Particular care shall be used when survey crews are forced to work on or near main line railroads, and when it is necessary to set up an instrument or set a point on the track, one man must stand by and keep a sharp lookout for trains, as the new diesel engines travel at very fast speeds and make very little noise.

A great deal can be done to improve our public relations on constrution work the same as on our other operations.

The general opinion is that the contractor carries insurance and has put up a bond so we are relieved of further responsibilty. Nothing could be farther from the truth, as the traveling public does not know the work is under contract and blames the State for lack of proper

signs, improper flagging and poor condition of detours.

It is not enough to place a sign at each end of the job reading "Construction Next 25 Miles" when only short sections are actually under construction, but additional signs or flagmen shall be placed at these locations.

When signs are destroyed they shall be replaced immediately, and at the completion of the job the signs must be removed promptly.

A neat flagman who can tell the traveling public in a few pleasant words why and for how long they are being stopped will do a great deal toward improving our public relations.

The Resident Engineer shall regularly check the signs and flagging operations on his job and shall take the same interest in this feature of the contract as he does in the other items.

Article 25—Accidents Involving State Equipment

The State insures all state-owned vehicles for Bodily Injury and Property Damage. The present policies provide limits of coverage as follows: namely, up to $20,000 private property damage, $100,000 personal injury to any one person, and $200,000 personal injury from any one accident.

The above insurance names the following persons as parties assured: State of Oregon, Oregon State Board of Control, all state of Oregon officers and/or all public officials and/or all department heads and/or all employees and/or all agents of each and of the State of Oregon. The policy also insures within its stated limits the financial responsibility of the named assureds in conformity with the motor vehicle financial responsibility law of any state or province, and the Company agrees to fulfill the requirements of any such law.

Your attention is drawn to the following exclusions to the property damage and liability coverage as follows:

1. It is understood and agreed that this policy is not intended to cover claims made on account of damage to any state vehicle by another state vehicle belonging to the same department or to any other state department.
2. It is further provided that this policy shall exclude any coverage for bodily injury or property damage, liability claims arising out of the use of air compressors, ditch or trench diggers, sand blasting or other surface cleaning machinery, tree or other spraying equipment, and well drilling machinery while operated as such. The policy does cover the operations of the above equipment as vehicles and also provides coverage for the operation of the automobile, motorcycle, tractor and/or trailer and miscellaneous equipment to which the excluded equipment is attached.

All accidents involving equipment either rented or owned and engaged in state service shall be reported on five copies of the Current Automobile Accident Report to the Maintenance Engineer, Salem, Oregon. These reports are required on all accidents involving directly or indirectly any state-owned or rented equipment with another individual's property, pedestrian, or equipment, whether our vehicle is stopped or moving, regardless of who was at fault or the amount of the damage.

The Resident Engineer, Crew Foreman or other staff member shall report by telephone to the Maintenance Engineer's office as soon as possible on any accident which results in injury to a person requiring immediate hospitalization or in death.

On above reports the equipment number will be shown where serial number is indicated. The location of the accident will be shown by highway name and mile point and by distance and direction to the nearest town. Additional copies of the section of the form covering personal injuries shall be made out for each additional person injured, care being taken that five copies of all sections of the report be furnished. Identify the vehicles involved by numbers on the sketch. All these reports must be signed by the driver involved and countersigned by the Crew Foreman and staff member.

Reports to the Secretary of State, as required by law, must also be filed with the local Sheriff or City Police. However, it is no longer necessary to send a copy to the Traffic Engineer at Salem.

The insurance company's report form and the Department of State's "Traffic Accident Report", Form OD 32, will be carried in stock at our storeroom and will be available on requisition.

Article 26—Travel Expense and per diem

Employes are entitled to receive compensation for expense incurred under the following conditions:

a. Expenses incurred in traveling to a new assignment. When the assignment is com-

pleted, and the employee is not reassigned, he will be entitled to expenses incurred in traveling back to the point where he was first assigned.

b. Expenses incurred while traveling on State business within the state, and on special assignments of less than ten days' duration away from established headquarters will be allowed, upon approval of the Division Engineer.

c. Except in the cases of those employees whose duties require continuous or very frequent travel, each trip for which expense allowance is to be claimed must be authorized *in advance* by the department official under whose direct supervision the employee is engaged.

d. Compensations to employees on survey parties and construction engineering parties, for extra living expense incurred in traveling to new work assignments and while on work assignments away from regular headquarters, will be on a per diem basis as hereinafter described.

e. Use of private automobiles in the conduct of State business is to be discouraged. However, in the event of absolute necessity and upon written authority of the State Highway Engineer, an allowance of 4 cents per mile for the first 1,000 miles driven in any one month and 6 cents per mile for the balance during any one month will be made.

The per diem allowance is to be paid under the conditions and to the extents described below:

Condition A.—When an employee (new or established—with dependents or without dependents) is transferred from one permanent headquarters to another permanent headquarters, he will be granted the per diem allowance for the first 30 days he is at the new permanent headquarters or enroute thereto.

Condition B.—When an employee (new or established) who has dependents and who has established a home for his dependents at his permanent headquarters, is assigned to work at a temporary headquarters, he will be granted the per diem allowance during the time that his assignment to that temporary headquarters continues and his dependent continues to reside at the permanent headquarters. The time limit under this condition will be 120 days. In the event a temporary assignment is expected to exceed 120 days, request for an extension should be submitted, fully explained as to necessity, length of time, etc.

Condition C.—When an employee who does not qualify under Condition B, as regards dependents and the establishment of a home, is assigned to a temporary headquarters, he will be granted the per diem allowance during such time as his assignment to the temporary headquarters continues, but not for more than 30 days.

The 30-day periods mentioned above under Conditions A and C, shall be understood to be 30 days exclusive of days on which the employee does not, due to restrictions stated hereinafter, receive the allowance.

A new employee or re-employee will receive no per diem allowance while at the place of his first assignment. He becomes eligible for the per diem (under Conditions A, B or C) only when transferred from the place of his first assignment or when assigned temporarily to a place distant from the place of his first assignment.

Per diem is not allowable under either Condition "B" or Condition "C", if the employee continues to reside at permanent headquarters and is transported to and from permanent headquarters in state-owned vehicles or otherwise at State expense.

Condition "A" shall not run concurrently with either Condition "B" or Condition "C". If the full 30 days of allowance to which an employee is entitled under Condition "A" is not allowed immediately, due to this limitation, the balance may be allowed at a later date after allowances under "B" and "C" have run their course. Payment of such balance will not be made, however, if the payment is prevented by this concurrency provision for more than one year.

Eligibility Requirements For Condition "B":

In order to be eligible to receive the per diem allowance under Condition "B", the employee must meet the following requirements:

1. He must have a dependent who customarily resides with him in the same home and who is dependent on him for at least one-half of his or her support.
2. He must, during the period for which the per diem is to be paid, have maintained a home for said dependent at the town which, in accordance with definitions given hereinafter, is his permanent headquarters.

Eligibility for allowance under Condition "B" terminates immediately when the required dependency terminates or when maintenance of the home at the permanent headquarters town ceases.

Permanent Headquarters:

In the beginning of a man's employment or re-employment with the Highway Department, the man will be considered a "new employee", and his permanent headquarters shall be the town (or place) from which it is expected he will work during most or all of the first several months of his employment. That town (or place) will continue to be his permanent headquarters as long as his work (disregarding temporary assignments) centers at that town or place. When his work no longer centers there, he will be assigned another permanent headquarters and thenceforth will be considered an established employee.

For an established employee (as distinguished from a new employee or a re-employee) the permanent headquarters will be the town which has been designated as the permanent headquarters for the engineering crew to which the employee is assigned. It will be a town at or near which suitable living quarters are obtainable for the members of the crew and their families, and it will be a town expected to serve for some considerable period of time as a base for the crew's operations.

Subject to such additions and deletions as may be made from time to time, the following is a list of the towns that may be designated as permanent headquarters for field engineering crews:

Astoria	The Dalles
Nehalem	Madras
Newport	Bend
Coos Bay-North Bend	Klamath Falls
	Lakeview
Gold Beach	Burns
Portland (including Milwaukie)	Condon
	Fossil
Salem	Pendleton
Eugene	La Grande
Roseburg	Enterprise
Grants Pass	Baker
Medford	Ontario
Hood River	John Day

Temporary Headquarters:

When the work to be done by a crew or an employee is so far distant from the permanent headquarters of the crew or the employee as to make daily transportation from and to the permanent headquarters uneconomical, some town or place nearer the work will be designated as headquarters from which to handle the work and the employees will be expected to make this town or place their headquarters for the time. A headquarters of that kind will be considered a "temporary headquarters" for all employees except (1) new employees or re-employees for whom the place is serving as a permanent headquarters or (2) employees who continue to reside at permanent headquarters and are transported to the work from permanent headquarters in state-owned equipment or otherwise at State expense.

Assigned to Headquarters:

Each employee will be assigned a "permanent headquarters" and the employee will work from that headquarters and/or from "temporary headquarters" tributary thereto, as the exigencies of the Department's work may require, until a new permanent headquarters is assigned to him.

New headquarters will be assigned from time to time as may be required to avoid excessive travel and excessive use of temporary headquarters, but it will be the endeavor of the Department to carry employees without change in permanent headquarters for as long periods as practicable, giving special consideration in this respect to married employees with established homes.

Assignment to "temporary headquarters" may be made on short notice and may be of such short or long duration as the needs of the work and the interests of the Department demand.

Rate of Per Diem Allowance:

The per diem allowance, when and for such days as it may be allowed will be at the rate of Four Dollars and Fifty Cents per day. The allowance is to be the same for a half-day as for a full day.

Per Diem Allowance Limitations:

Except as otherwise indicated in the paragraphs which follow, the per diem will be allowed only for the days on which the employee works.

For full-time employees the per diem will be allowed on legal holidays and on Sundays, Saturdays and/or other days which are the regularly scheduled "days-off" for the employees concerned, except when those days are within or at the end of an absence or leave which includes more than three work days and which is not itself an absence or leave eligible for per diem allowance. For part-time employees and

employees working intermittently, allowances for holidays, Sundays, Saturdays and/or other regularly scheduled "days-off", shall not exceed two days for each five days worked and shall be none if the time worked during the monthly period is less than five days.

The per diem will be allowed on days on which exchange time leave is taken, with the limitations that not more than three days of per diem will be allowed for any one such leave.

The per diem will be allowed on days on which earned sick leave is taken, with the limitation that not more than three days of per diem will be allowed for any one such leave.

The per diem will not be paid for days when the employee is on vacation leave, and will be paid when the employee is on sick leave or exchange time leave only to the extents above-stated.

No Allowance Beyond Period of Employment:

No provisions of these regulations shall be construed as entitling the employee to receive the per diem allowance for days outside of or beyond the period of the employee's employment with the Department. Only such allowances will be made as can be made regularly and in accordance with these regulations, during the period that the employee is carried on the Department's pay roll.

Expense Allowance on Special Trips and on Work Assignments of Short Duration:

When an employee is required to be away from his permanent headquarters on work assignments of duration less than ten (10) calendar days or is required to be away from his headquarters (permanent or temporary) on trips of a nature differing from ordinary work assignments, which trips involve travel expense considerably in excess of the per diem allowance, the employee may, with the approval of his immediate superior, be allowed reimbursement, on the standard travel expense basis, for expense so incurred. An employee to whom travel expense is allowed for any day or fractional day, as here indicated, will not receive the per diem allowance, or any part thereof, for the same day.

The following instructions pertain to the accounting procedure in connection with the per diem expense allowance for field engineering crews.

The "Per Diem Expense Allowance Statement", form A-250, is to be used in reporting per diem allowance to be paid to employees of field engineering crews.

The period to be reported on the per diem expense allowance statement is from the 11th day of one month to and including the 10th day of the following month.

The crew number and name of the engineer in charge, are to be written on the lines provided therefor, at the upper left-hand corner of the form.

The name of the month containing the part-period from the 11th to the 31st, is to be written in the space marked (1) on the form. The name of the month containing the part-period from the 1st to the 10th is to be written in the space marked (2) on the form. The year is to be indicated after each month.

The initials representing the days of the week corresponding to the dates of the period being reported, are to be written in the spaces above the dates printed on the form.

The status of the employee is to be indicated by "X" in the space marked "Status", on the form. "N" stands for "New", and "E" stands for "Established".

The space for the name of the employee is indicated on the form, by the word "Name".

In the event the employee maintained a home for dependents, the name of the town, where such home was maintained, is to be written after the word "At", and the inclusive dates of the period during which such home was maintained are to be written in the spaces after the words "From" and "To". In indicating these dates, use the figure representing the month, as 7-25 for July 25. The year is not required. Home locations of dependents should be shown only when per diem allowance is claimed under Condition "B" and then only for locations occupied during the period covered by the statement.

If the employee has been allowed only part of his eligible allowance time under Condition "A", or Condition "C", as explained in per diem expense allowance, the total number of days previously allowed, is to be shown after the letters "A" or "C", on the line opposite the words "Partial Allowance (Days) Previously Allowed", printed on the form.

The Conditions (A, B, or C), under which the employee is to be paid a per diem allowance, as

explained previously, are to be written in the column headed "Condition" on the form.

In the space on the form indicated by one asterisk (*), write the permanent headquarters of the employee. In the space indicated by two asterisks (**), write the temporary headquarters of the employee. When the headquarters (permanent or temporary) of an employee changes, draw a vertical line (in colored pencil) after the last date before such a change. The verticle line should be drawn through the five spaces allotted to the employee on the form.

The time of each employee, who is to be paid a per diem allowance, is to be indicated for the entire period covered by the per diem expense allowance statement, even though part of such time may be ineligible for an allowance. The code to be used for indicating the time of an employee is printed on the per diem expense allowance form, but is repeated here for purposes of explanation:

Time Code Legend

Class of time	*Eligible for allowance*	*Ineligible for allowance*
Actual working time	X	—
Saturdays, Sundays, and holidays	X	—
Exchange time leave	(E)	E
Sick leave taken	(S)	S
Vacation leave		V
Absent without pay		A
Days on full expense basis		F

One of the foregoing symbols must be shown in each date column for each employee, except for the days on which he was not employed. Please note that practically the same symbols are used for eligible and ineligible exchange time leave, and for eligible and ineligible sick leave taken, the difference being that the eligible time of such classes of leave is indicated by the symbol within a circle.

Saturdays, Sundays and holidays are to be shown in the same code as working time, even when occurring within the time limits of leaves and absences.

The total number of days allowed, is to be shown for each prefix for each employee, in the column headed "Total Days Allowed" on the statement.

The extension of each total number of days times four dollars and fifty cents, is to be shown in the column headed "Amount by Prefix" on the statement.

The total amount of per diem allowance for each employee, for the period covered, is to be shown in the column headed "Net Total Due". Please enter the total opposite the last item shown in the preceding column.

The total amount of per diem allowance to be paid to one crew, is to be written on the last line in the "Net Total Due" column, on the last sheet submitted for the crew.

The person preparing the per diem allowance statement, is to sign all copies of each sheet of the statement, and the engineer in charge is to affix his signature approving all copies of each sheet of the statement.

The cost distribution is to be summarized by prefixes, and written in the space provided therefor on the back of the per diem allowance statement. The summary is to be shown on the back of the last sheet submitted for one crew.

Form A-250 is to be prepared in quadruplicate. The first three copies are to be forwarded to the respective Division Enginer, who is to approve and forward all three copies to the respective Staff Engineer. The Staff Engineer is to approve the first two copies and forward them to the Accounting Division.

In the event that an employee whose name appears on a per diem allowance statement is entitled to an allowance on an expense account basis, for any part of the time covered by the per diem allowance statement, the expense statement must accompany the per diem statement.

In transporting employees from one survey or construction job to another, use shall be made of state-owned equipment insofar as possible. In order to provide room in the equipment for the personnel, the engineering supplies, etc., may be shipped by express or freight. Personal effects of employees shall not be transported by means of state-owned equipment.

In cases where employees use their own cars in traveling from one job to another, stage or railroad fare will not be allowed if there is ample room in state-owned equipment.

In transferring employees from one job to another, use the shortest and most direct route and see that expenses are not allowed for periods which exceed a reasonable length of time.

Expense accounts shall be rendered at least once a month and not more than twice a month. They should be properly itemized and rendered on form A-23, and approved by the division head or his assistant. Division heads shall ex-

amine each expense account rendered to ascertain that all rules and regulations are being complied with.

Officials and employees are not permitted to pay the expenses of other officials or employees with the following exceptions: toll bridge and ferry fares may be paid by one member of the party and submitted on his account. When so submitted, the name of each state employee for whom such fare was paid shall be shown.

The following personal expenses will not be allowed: Cost of transporting personal baggage, tips, laundry or barbering.

Charges for breakfast will not be allowed on the day of departure from offical headquarters unless a specific notation on the expense account indicates an unusual starting time which justifies the allowance. Likewise, charges for dinner will not be allowed for the day of return to official headquarters if such return could have been made by 6 p. m. had the employee not stopped for dinner. When dinner is claimed the time of arrival at headquarters must be shown on the expense statement.

Claims for hotel accommodation at points within 25 miles of the official headquarters of the claimant will not be allowed.

Employees who remain in one location for more than 10 days shall be deemed to have established headquarters at such location and allowance for meals and lodging thereafter will not be made. Exceptions to the above may be made with the prior approval of the Chief Engineer.

Receipts are to be obtained and attached to the expense statement for every item of expense, including lodging, over $1.00, excepting the following:

1. Railroad, airline or stage fares where fares are in accordance with published tariff schedules.
2. Meals.
3. Bridge and ferry tolls.

Federal taxes on transportation, telephone calls, telegrams and other items are not reimbursable. Employees should avoid payment by submitting tax exemption certificates (form A-201) to the seller. Duplicate copies of the certificate should be attached to the expense statement as evidence that the amount claimed is exclusive of tax.

The maximum allowance for three meals in one day within the state shall be $4.00. The amount expended for any particular meal is left to the discretion of the individual, but the total three meals shall not exceed the maximum allowance for any one day. Claims should be made for the amounts actually paid, subject to the maximum limits per meal.

The maximum allowance for individual meals (less than three in one day) within the state is breakfast—$1.00, luncheon—$1.00, dinner,—$2.00.

Meals on trains will be paid at the same rate as out-of-state; that is, breakfast—$1.25, luncheon—$1.75, dinner—$2.50.

The allowance for hotel accommodations shall be the actual amount paid but not to exceed $5.50 per night. Receipts therefor must be attached to the expense statement showing the hotel name and address signed by the person receiving payment. No alterations to the date and amount will be permitted.

The maximum allowance for out-of-state expense for meals and lodging shall not exceed $12.00 for each 24 hours at point of destination.

If subsistence is claimed while at destination for a period of less than 24 hours, actual expenses will be allowed subject to the following maximums: breakfast—$1.25, luncheon—$1.75, dinner—$2.50, lodging—$6.50 per night.

Subsistence on trains will be allowed while en route subject to a maximum of $5.50 for each 24 hours. If time en route is less than 24 hours, actual expenses will be allowed for meals not to exceed: breakfast—$1.25, luncheon—$1.75, dinner—$2.50.

Indicate clearly in spaces provided on form 23 whether transportation is by rail, stage or private car. Items of meals and lodging should be shown opposite each location at which the charge was incurred, using a single space for each location. Expenses for one month are not restricted to one sheet of this form. The total of meals, lodging, car storage, transportation and miscellaneous items must be shown in the summary. This expense account form shall be approved and signed by the Resident Engineer or other person in charge and by the Division Engineer.

See Section 16, Article 30 for expense accounts amounting to more than $50.00.

TRANSPORTATION OF EMPLOYEE'S HOUSEHOLD EFFECTS

When an employee, who has established himself and his family in a home at or near his headquarters location, is transferred by the Department to a new headquarters location at which he will be retained for several months, it will be in order for the Division Engineer or Department Head to request payment by the Department of the expense of transporting the employee's household effects from one location to the other. If such request is approved by the State Highway Engineer or Assistant State Highway Engineer, and the requirements stated below are fully conformed with, the cost of transporting the household effects will be paid by the Department.

Approval may be obtained under the following requirements:

1. The transferred employee must be moving from an established headquarters to a new permanent or lasting assignment.
2. The transfer of the employee is made for the convenience of the department and not for the convenience of the employee.
3. Authority shall be secured in advance, from Assistant State Highway Engineer, through the use of Form E-302, Request for Authorization to Move Household Effects. In case of emergency, authority may be obtained by phone, radio or telegraph. Such authority must be confirmed by use of Form E-302.
4. All moving shall be done by licensed commercial carriers. Use of State trucks will not be permitted unless commercial carriers are not available.
5. Payment will be made only for standard transportation (at the convenience of the carrier). If expedited service is desired, the employee shall pay the additional cost over and above standard rates except in exceptional cases whereby the State will benefit by use of expedited service. In these cases approval must be secured in advance from Assistant State Highway Engineer through the respective Staff Engineer.
6. If the employee desires additional insurance above that normally provided by public carriers, he shall bear the added expense.
7. Packing charges *will not* be paid under any circumstances.
8. It will not be necessary to secure bids from competitive carriers, as all operate on standard rates established by the Public Utilities Commission.
9. The bill for transportation shall be made against the Oregon State Highway Department, and is not to be paid by the employee with the expectation of receiving reimbursement as an expense account item. In the event that extra charges are incurred for the convenience of the employee, he shall arrange with the transporting company as to payment of the excess costs.

The bill for the transportation should be made against the Oregon State Highway Commission for direct payment by the Department, and should be transmitted to the Accounting Division by the Division Engineer or Department Head with a letter describing the circumstances, giving his recommendation and giving comparative cost information when alternate means of truck transportation are available. The State will not pay for expedited service.

The expense of transporting household effects should not be paid by the employee with the expectation of receiving reimbursement as an expense account item. Payment will not be approved when the transfer of the employee involved is made for the convenience of the employee more particularly than the convenience of the Department.

Bills for the transportation of household effects are to be paid by the Accounting Division only when payment is approved by the appropriate Staff Engineer and the State Highway Engineer or Assistant State Highway Engineer.

Article 27—Regular Accounts to be Paid Through Salem Office

The Salem office prefers that all regular accounts be paid through the Accounting Division instead of the Resident Engineer paying each and including same on his expense account.

Article 28—Anthropological or Geological Discoveries

Notify Professor L. S. Cressman, Curator of Anthropology of the University of Oregon at Eugene of any discoveries made of an anthropological (pertaining to man) or geological nature. If a discovery of any amount is made, rearrange your plan of working or stop construction operations in the vicinity of the discovery in order that it not be disturbed. Archaeological investigations depend in a great measure upon the examination of the fossils or artifacts before they have been moved.

Any discoveries of an anthropological or geological nature upon the right of way or upon

state property, becomes the property of the State and not the property of the person or persons making the discovery.

Article 29—Remove Broken Glass and Reduce Traffic Hazards

All employees are instructed to remove broken glass and dangerous obstructions from the pavement.

Article 30—Purchase of Books and Scientific Instruments to be Approved

All requests for scientific instruments and technical books which are to be department owned shall be made through the Division Engineer to the Assistant State Highway Engineer.

Article 31—Membership in Organizations

The Highway Commission does not give consideration in the employment, retention or dismissal of its employees to their membership in political parties, fraternal orders, their religious affiliations or union membership. It does not discriminate among its employees because of their membership or non-membership in such associations. The Department Executives, as in the past, will hire, discharge and promote on the basis of merit and merit alone without dictation from any group.

However, in the matter of employment and dismissal, the following Act, Chapter 311, Oregon Laws 1949, is quoted:

> "Section 1. A person shall not be knowingly employed by any department, board or commission of the state of Oregon who either directly or indirectly carries on, advocates, teaches, justifies, aids or abets a program of sabotage, force and violence, sedition or treason against the government of the United States or of the state of Oregon.
>
> Section 2. Any person employed by any state department, board or commission of the state of Oregon shall immediately be discharged from employment when it becomes known to the appointing employer that said person has, during the period of his employment, committed any offense as set forth in section 1 of this act.
>
> Section 3. Any person denied employment or discharged by reason of this act shall have a right of appeal in accordance with the provisions of chapter 400, Oregon Laws 1945."

Article 32—Garnishments and Assignments of Wages

All garnishments or assignments of wages must be forwarded *immediately* to the Salem office for action, with a notation thereon of the date and the hour of service, signed by the person upon whom service is made.

In the event that during the interim between the service of the garnishment or filing of the assignment and the receipt of the papers by the Salem office, a check which would be affected has been sent out by the Accounting Division, the same shall not be delivered to the payee but shall be returned to the Pay Roll Supervisor immediately, with a letter of explanation.

Time checks are not to be issued any employee who has a garnishment filed against his wages.

Article 33—Research Work

From time to time, throughout the State, different members of the department conduct experiments and investigations concerning problems related to their work. Even though much of this work is not of such an important or extensive nature as to be listed as a formal research project, the results would be useful to other engineers doing similar work.

In many instances, the results of the experiment have been utilized in the particular case for which the investigation was conducted and the whole matter has thus ended. Repetition could be avoided if the information obtained was brought to the attention of those doing similar work. To accomplish this purpose, reports of any such work are to be made and sent through the proper division and staff officer to the Bridge Engineer, who will coordinate the reports and distribute the information to all interested parties.

You are urged not to assume that, because the result of an experiment was negative or the matter of no great import, it is not worth reporting. Many times there is considerable value in knowing that a particular method of doing something will not work. The work of the department must be performed in the most efficient manner possible, and the exchange of worthwhile information is an essential step to that end.

OREGON TRAFFIC ACCIDENT AND SAFETY RESPONSIBILITY REPORT

DEPARTMENT OF STATE
SALEM, OREGON

(NOT OPEN TO PUBLIC INSPECTION)

DO NOT WRITE IN THIS SPACE
Code No.
File No.

Date of Accident ... Month ... Day ... Year ... In or Near ... City or Town

Make of Your Vehicle ... Type ... Year ... License No. ...

Driver ... Address ...

Owner ... Address ...

Were You Driving a Vehicle Owned, Operated, or Leased by Your Employer and With His Permission? Yes ☐ No ☐

Name of Company Issuing Your Liability and Property Damage Insurance ...

Agent Who Sold Policy ... Address ...

Policy Period From ... to ... Policy Number ...

Policyholder ... Address ...

THIS IS A COMBINED REPORT AND MUST BE COMPLETED ON BOTH SIDES. DO NOT DETACH

DO NOT WRITE IN THIS SPACE
No.
Inc.
1st Let.
2nd Let.
Inv. ... Post DR
To FRD
Coded ... Inter.

TIME

Date of Accident ... 19 ... Day of Week ... Hour ... ☐ A.M. ☐ P.M.

LOCATION

County of ... City of ...

If Outside City Limits ... Miles ☐ North ☐ East ☐ South ☐ West of Town, Community

Accident Occurred on ... Name or Number of Street or Highway

Check and Complete One:
At Intersection With ... Name or Number of Street or Highway
If Not at Intersection ... Feet ☐ North ☐ East ☐ South ☐ West of Cross Street, Highway, Bridge, Etc.

TYPE

Accident Involved Motor Vehicle and
1 ☐ One other car
2 ☐ Two or more other cars
3 ☐ Pedestrian
4 ☐ Railroad train
5 ☐ Horse-drawn vehicle
6 ☐ Bicycle
7 ☐ Motorcycle
8 ☐ Animal
9 ☐ Streetcar
X ☐ Fixed object
R ☐ Non-collision

YOUR CAR

VEHICLE No. 1
Your Car ... Year ... Make ... Type of Vehicle ... Sedan, Truck, Etc. ... Vehicle License ... Year ... State ... Number ... I.C.C. or P.U.C. No.

DRIVER ... Name ... Street or RFD ... City and State ... Age ... ☐ Male ☐ Female

Occupation ... Farmer, Doctor, Etc. ... Driving Experience ... Years ... Driver's License ... State and Number

OWNER ... Name ... Street or RFD ... City and State

Vehicle was going ... East, North, Parked, Etc. ... OR ... Street or Highway, Name or Number ... Estimated Speed ... Approximate Cost to Repair Vehicle $

OTHER CAR

VEHICLE No. 2
Other Car ... Year ... Make ... Type of Vehicle ... Sedan, Truck, Etc. ... Vehicle License ... Year ... State ... Number ... I.C.C. or P.U.C. No.

DRIVER ... Name ... Street or RFD ... City and State ... Age ... ☐ Male ☐ Female

Occupation ... Farmer, Doctor, Etc. ... Driving Experience ... Years ... Driver's License ... State and Number

OWNER ... Name ... Street or RFD ... City and State

Vehicle was going ... East, North, Parked, Etc. ... OR ... Street or Highway, Name or Number ... Estimated Speed ... Approximate Cost to Repair Vehicle $

INJURED

NAMES AND ADDRESSES OF PERSONS INJURED OR KILLED	Age	Sex	Driver	Passenger	Pedestrian	Slight Injury	Severe Injury	Killed
1								
2								
3								

IF MORE SPACE IS NEEDED CONTINUE UNDER REMARKS

ROAD

WEATHER
1 ☐ Clear
2 ☐ Cloudy
3 ☐ Rain
4 ☐ Sleet
5 ☐ Fog
6 ☐ Snowing
7 ☐ Dust
8 ☐ Smoke

LIGHT
1 ☐ Daylight
2 ☐ Dawn
3 ☐ Dusk
Darkness with:
4 ☐ Street light between intersections
5 ☐ Street lights at intersections
6 ☐ No street lights

DISTRICT
1 ☐ Business
2 ☐ Industrial
3 ☐ Residential
4 ☐ School
5 ☐ Open area
6 ☐ Built-up area or community
7 ☐ Other—specify

ROAD DEFECTS
1 ☐ Low or soft shoulders
2 ☐ Holes or ruts in road
3 ☐ Lighted obstruction
4 ☐ Unlighted obstruction
5 ☐ Obstruction by previous accident
6 ☐ Road under repair
7 ☐ Loose gravel
8 ☐ No defect

TYPE OF ROAD
1 ☐ Paved—center stripe
2 ☐ Paved—no center stripe
3 ☐ Gravel
4 ☐ Earth
5 ☐ Plank road or bridge

CHARACTER OF ROAD
1 ☐ Street or highway intersection
2 ☐ Alley or driveway intersection
3 ☐ Straight
4 ☐ Curve
5 ☐ Bridge

GRADE
1 ☐ Level
2 ☐ Up or downgrade
3 ☐ Hillcrest

ROAD SURFACE
1 ☐ Dry
2 ☐ Wet
3 ☐ Snowy
4 ☐ Icy
5 ☐ Muddy
6 ☐ Slippery

TRAFFIC CONTROL
1 ☐ Traffic signals
2 ☐ Flashing beacon
3 ☐ Stop sign
4 ☐ Warning sign
5 ☐ Police officer
6 ☐ Railroad signal—sign
7 ☐ No passing zone—painted
8 ☐ No control
9 ☐ Control not operating

OVER—Report Must Be Complete on Both Sides

Form OD-32 -Rev. 6-51

CHECK WITH AN × ALL ITEMS THAT APPLY TO THIS ACCIDENT

DRIVER'S VIEW OBSTRUCTED BY (Check one for each driver)
1 ☐☐☐ Rain or snow, etc. on windshield
2 ☐☐☐ Cracked or dirty windshield
3 ☐☐☐ Load on vehicle
4 ☐☐☐ Standing vehicle
5 ☐☐☐ Buildings
6 ☐☐☐ Trees, crops, etc.
7 ☐☐☐ Embankments
8 ☐☐☐ Sign boards
9 ☐☐☐ No obstruction

CONDITION OF VEHICLES (Check one for each car)
1 ☐☐☐ Faulty brakes
2 ☐☐☐ Tail light out or obscured
3 ☐☐☐ Glaring headlights
4 ☐☐☐ One headlight out
5 ☐☐☐ Both headlights out
6 ☐☐☐ Puncture or blowout
7 ☐☐☐ Defective steering gear
8 ☐☐☐ Other defects (explain)
9 ☐☐☐ No defects apparent

WHAT DRIVERS WERE DOING (Check one for each driver)
1 ☐☐☐ Going straight ahead
2 ☐☐☐ Making right turn
3 ☐☐☐ Making left turn
4 ☐☐☐ Making "U" turn
5 ☐☐☐ Overtaking
6 ☐☐☐ Forward from curb
7 ☐☐☐ Backing from curb
8 ☐☐☐ Other backing
9 ☐☐☐ Stopped in traffic
10 ☐☐☐ Parking
11 ☐☐☐ Parked car—no driver
12 ☐☐☐ Driverless moving vehicle

ANGLE OF COLLISION
1 ☐ Broadside or right angle
2 ☐ Head-on
3 ☐ Rear-end
4 ☐ Backed into other vehicle
5 ☐ Sideswiped—meeting
6 ☐ Sideswiped—overtaking
7 ☐ Turning movement
8 ☐ Parking
9 ☐ Pedestrian accidents
10 ☐ Other single vehicle accidents

DRIVER'S VIOLATIONS INDICATED (Check one or more for each driver)
1 ☐☐☐ Excessive speed
2 ☐☐☐ Did not have right of way
3 ☐☐☐ On wrong side of road
4 ☐☐☐ Drove through safety zone
5 ☐☐☐ Passing on curve
6 ☐☐☐ Passing near crest of hill
7 ☐☐☐ Passing on wrong side
8 ☐☐☐ Passing standing streetcar
9 ☐☐☐ Passing at intersection
10 ☐☐☐ Cutting in
11 ☐☐☐ Failure to signal, improper signal
12 ☐☐☐ Wide right turn
13 ☐☐☐ Cut corner on left turn
14 ☐☐☐ Turned from wrong lane
15 ☐☐☐ Turned into wrong lane
16 ☐☐☐ Disregarded stop sign or signal
17 ☐☐☐ Disregarded warning sign or signal
18 ☐☐☐ Disregarded police officer
19 ☐☐☐ Improper starting
20 ☐☐☐ Improper or double parking
21 ☐☐☐ Following too close
22 ☐☐☐ Drove off roadway
23 ☐☐☐ Forced off roadway
24 ☐☐☐ Made sudden stop
25 ☐☐☐ Avoiding pedestrian, vehicle or object
26 ☐☐☐ Skidding
27 ☐☐☐ Car ran away—no driver
28 ☐☐☐ Other improper action
29 ☐☐☐ No improper driving

CONDITION OF DRIVER AND PEDESTRIAN
1 ☐☐☐☐ Physical defect, eyesight, etc.
2 ☐☐☐☐ Fatigued—ill
3 ☐☐☐☐ Apparently asleep
4 ☐☐☐☐ Blinded by headlights or sun
5 ☐☐☐☐ Confused by traffic
6 ☐☐☐☐ Apparently normal
7 ☐☐☐☐ Unknown

1 ☐☐☐☐ Had not been drinking
2 ☐☐☐☐ Had been drinking
a ☐☐☐☐ Obviously drunk
b ☐☐☐☐ Ability impaired
c ☐☐☐☐ Ability not impaired
d ☐☐☐☐ Not known if impaired
3 ☐☐☐☐ Not known whether drinking

PEDESTRIAN'S ACTIONS
1 ☐ Crossing at intersection—no traffic signal
2 ☐ Same—against traffic signal
3 ☐ Same—with traffic signal
4 ☐ Same—diagonally
5 ☐ Crossing between intersections
6 ☐ Crossing highway
7 ☐ Coming from behind parked vehicle
8 ☐ Getting on or off streetcar
9 ☐ Standing in safety zone
10 ☐ Getting on or off vehicle
11 ☐ Walking in roadway facing traffic
12 ☐ Walking in roadway with traffic
13 ☐ Playing in street or roadway
14 ☐ Working on car in roadway
15 ☐ Working in road
16 ☐ Walked into side of car
17 ☐ Stepping from curb
18 ☐ Hitching on vehicle
19 ☐ Not in roadway
20 ☐ Not known

Pedestrian was going ... North, East, Etc. ☐ On ☐ Across Street or Highway Name

Were crosswalks marked ☐ Yes ☐ No

Was pedestrian inside markings or extensions of sidewalk lines ☐ Yes ☐ No

Pedestrian was wearing ☐ Light—colored clothing ☐ Dark—colored clothing

DAMAGE TO PROPERTY OTHER THAN VEHICLES ... Describe Object and Give Name of Owner ... Approximate cost to repair $

Use one of figures as guide to draw outline of roadway at scene of accident. Show distances and directions to landmarks. Indicate street and highway names. Indicate
Your Car 1
Other Car 2
Pedestrian

INDICATE ON THIS DIAGRAM WHAT HAPPENED

Indicate north by completing arrow

N

Name Street or Highway ... Name of Street ... Name of Street

Additional remarks and further description of accident, vehicles, drivers, or persons injured

Report received by ... Signature of Officer ... SIGN HERE ... Person Making Report

IMPORTANT: This accident should also be reported directly to your liability and property damage insurance company or representative.

DO NOT WRITE BELOW THIS LINE OR DETACH THIS FORM

(Department to Mail This Stub to Insurance Company for Verification)

To: Department of Financial Responsibility
Salem, Oregon

The undersigned company advises that our policy, as indicated on the reverse of this form, WAS NOT effective at the time of this accident because:

Name of Insurance Company ... By ...

Date ...

If this form is marked to indicate that the policy was not in effect, it must be returned to the Department within 20 days from the following date:

FORM A-290

OREGON STATE HIGHWAY DEPARTMENT

PER DIEM EXPENSE ALLOWANCE STATEMENT

CREW NUMBER 099-08

ENGINEER IN CHARGE: John Doe

LEAVE BLANK
STMT. NO. ____
SHEET NO. ____

FILL IN
SHEET NO. 1
OF 1 SHEETS

TIME CODE LEGEND		
CLASS OF TIME	ELIGIBLE	INELIGIBLE
ACTUAL WORKING TIME	X	—
SAT., SUN. AND HOLIDAYS	X	—
EXCHANGE TIME LEAVE	(E)	E
SICK LEAVE TAKEN	(S)	S
VACATION LEAVE		V
ABSENT WITHOUT PAY		A
DAYS ON FULL EXP. BASIS		F

	NAME	PREFIX AND FUNCTION NO.	CONDITION	(1) January 1953 — S M T W T F S S M T W T F S S M T W T F S S M T W T F S S M T	(2) February 1953 — S M T W T F S S M T	TOTAL DAYS ALLOWED	AMOUNT BY PREFIX	NET TOTAL DUE	CHECK NO.
				11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10				
STATUS N ___ E X	John Doe			• Eugene / •• Cave Junction	Cave Junction				
HOME FOR DEPENDENTS MAINTAINED	AT Eugene FROM 1-11 TO 1-22	217-1434-900	B	X X X X X X X X X X X X		12	54.00		
	AT Kerby FROM 1-23 TO 2-10	217-1434-900	C		X X X X X X X X X X X X X X X X X X X	19	85.50		
PARTIAL ALLOWANCE (DAYS) PREVIOUSLY ALLOWED: A C								139.50	
STATUS N ___ E X	Robert R. Brown			• Brookings / •• Cave Junction					
HOME FOR DEPENDENTS MAINTAINED	AT FROM TO	217-1434-900	A	X X X X X X X X X		9	40.50		
	AT FROM TO								
PARTIAL ALLOWANCE (DAYS) PREVIOUSLY ALLOWED: A 21 C								40.50	
STATUS N ___ E X	Harold E. Davis			• Brookings / •• Cave Junction					
HOME FOR DEPENDENTS MAINTAINED	AT FROM TO	217-1434-900	A	X X X X X X X X X X X		11	49.50		
	AT FROM TO								
PARTIAL ALLOWANCE (DAYS) PREVIOUSLY ALLOWED: A 19 C								49.50	
STATUS N ___ E X	Richard L. Gray			• Brookings / •• Cave Junction					
HOME FOR DEPENDENTS MAINTAINED	AT Grants Pass FROM 1-10 TO 1-26	217-1434-900	C	X X X X X A A A X X X X X X X X		13	58.50		
	AT FROM TO								
PARTIAL ALLOWANCE (DAYS) PREVIOUSLY ALLOWED: A C 17								58.50	
STATUS N ___ E X	William B. Williamson			• Brookings / •• Cave Junction					
HOME FOR DEPENDENTS MAINTAINED	AT FROM TO	217-1434-900	A	X X X X X X X X X X X X X		13	58.50		
	AT FROM TO								
PARTIAL ALLOWANCE (DAYS) PREVIOUSLY ALLOWED: A 17 C								58.50	

• ON THIS LINE SHOW EMPLOYEE'S PERMANENT HEADQUARTERS

•• ON THIS LINE SHOW EMPLOYEE'S TEMPORARY HEADQUARTERS

PREPARED BY: John Doe

APPROVED BY: John Doe — ENGINEER IN CHARGE

AUDITED

POSTED

TOTAL FOR CREW 346.50

PER DIEM ALLOWANCE
SUMMARY BY ACCOUNT NUMBERS

JOB PREFIX	FUNC-TION NO.		TOTAL CHARGE TO JOB	
217-1434	900		346	50
TOTAL				

PER DIEM ALLOWANCE
SUMMARY BY SHEETS

SHEET NO.		NET TOTAL DUE	
1		346	50
TOTAL		346	50

FOLD

OREGON STATE HIGHWAY DEPARTMENT
SALEM, OREGON

PER DIEM EXPENSE ALLOWANCE STATEMENT

CREW 099-08

PERIOD FROM 1-11 TO 2-10 19 53

APPROVED M. A. Hanson
DIVISION ENGINEER

APPROVED B. R. Jones
STAFF ENGINEER

CHECKS TO BE DELIVERED OR SENT TO:

John Doe
NAME
Box 123
Cave Junction, Oregon
ADDRESS

Form A-201—12M—11-41

OREGON STATE HIGHWAY COMMISSION
Salem, Oregon

Exemption Certificate

(For items purchased for cash)

Date March 2 1943 No. 1

The undersigned hereby certifies that he is Transitman (Title) of the Oregon State Highway Commission and that he is authorized to execute this certificate and that the article or articles specified below are purchased from Southern Pacific R. R. Co. (Name of Company) for the exclusive use of the State Highway Commission of the state of Oregon. It is understood that the exemption from tax in the case of sales of articles under this exemption certificate to the United States, states, etc., is limited to the sale of articles purchased for their *exclusive use*, and it is agreed that if articles purchased tax free under this exemption certificate are used otherwise or are sold to employes or others, such fact will be reported by me to the manufacturer of the article or articles covered by this certificate. It is also understood that the fraudulent use of this certificate to secure exemption will subject the undersigned and all guilty parties to a fine of not more than $10,000, or to imprisonment for not more than five years, or both, together with costs of prosecution.

Signature John A. Doe Title Transitman

DESCRIPTION OF ARTICLE	Gross Amount Charged		Less Federal Excise Tax		Net Amount Paid	
R.R. Ticket - Salem to Klamath Falls	7	57		99	6	58

INSTRUCTIONS: Gross amount charged, federal excise tax, and net amount paid, are to be shown for each item. Attach copy of this certificate to expense account.

Received payment:

Seller

SECTION 2. TIME REPORTS AND ABSENCES

Article
1. Standard Wage Schedule.
2. Attendance Time Reports and Absences.
3. Preparation of Time Reports.
4. Hours of Employment and Overtime.
5. Instructions Applicable to All Classes of Absent Time.
6. Accounting Procedure—Vacations and Sick Leaves.
7. Accounting Procedure for Withholding Tax Deductions.
8. Time Statements.
9. Time Checks.
10. Receipts for Time Checks.
11. Monthly Statement of Checks Issued.
12. Division Office to Keep Time Statement Register.
13. General Instructions Regarding Time Checks.
14. Delivery of Regular Pay Checks.

Article 1—Standard Wage Schedule

Wage rate schedules are available and may be requisitioned from the personnel department. No rate will be allowed except as contained in the current list. Be sure to give only a title as listed; others will not be approved.

Article 2—Attendance, Time Reports and Absences

SUNDAYS, SATURDAYS AND HOLIDAYS

Schedules of regular working hours have been established for each organization unit. These provide for a work week of forty hours for employees except where exigencies of departmental operations necessitate longer hours and where such conditions were considered in setting pay schedules. It is the policy to provide for hours of work which will be uniform for employees without restricting services to the public.

The following and in addition any other days designated by the Governor or President of the United States or under the authority of either such officer, or days such as primary or general election day fixed by statute are holidays for full-time salaried employees in the classified service.

New Year's Day	Armistice Day
Lincoln's Birthday	Thanksgiving Day
Washington's Birthday	Memorial Day
Labor Day	Independence Day
	Christmas

When hourly rates are established for any class or position the determination of holidays allowed with pay for such class or position shall be based on the employment and compensation conditions applicable to each case. Compensatory time off shall be allowed for work done on these days by salaried employees. Whenever a holiday falls on Sunday, the following Monday shall be considered a holiday. Holidays which occur during a vacation leave shall not be charged against vacation leave.

All employees—both six step salary range and three step salary range—shall be paid for holidays in accord with these rules. Emergency employees will not be paid for holidays.

If a holiday falls on Saturday, the following applies:

(a) An employee who ordinarily does not work the Saturday in question or is not scheduled to work the Saturday in question will not receive any additional credit for this day. However, if such an employee is on vacation or sick leave he will not be charged for this Saturday.

(b) An employee who ordinarily does not work on Saturday or is not scheduled to work the Saturday in question, but is required to work this particular Saturday receives, in addition to his regular pay, either overtime pay or exchange time credit. Such pay or exchange time credit will be at the one and one-half time rate provided that the hours actually worked at the single rate during the week exceed the scheduled weekly total.

(c) An employee who ordinarily works Saturday morning and does work on the morning of the Saturday in question receives one half day of exchange time credit or cash compensaton. If, in addition, he should be required to work that Saturday afternoon, he receives time and one-half for that portion of the day, provided the hours are as stated above in (b).

If a holiday falls on an employee's regularly assigned day off in lieu of Sunday, he shall be granted credit for one day. If he works on a holiday which falls on his day off, he receives credit for one day, plus time and one-half credit or overtime pay for that portion of the day he works. If an employee works on a holiday that falls during the regularly scheduled work week, he shall get paid for that day plus straight time credit for the portion of the day worked.

A holiday falling within the work week will be considered as a day worked for the purpose

of computing the hours in the regularly scheduled work week.

"Credit" as used above is defined as follows:

(a) For all classes eligible for exchange time, "credit" will refer to credit toward exchange time, for which it will be necessary to submit form 220.

(b) For all classes not eligible for exchange time, "credit" will refer to credit toward vacation, and those eligible will be shown on a list which will accompany the time report.

Any unauthorized absence of an employee from duty shall be deemed to be absence without pay and may be made grounds for disciplinary action. Any employee who absents himself for five consecutive days without authorized leave shall be deemed to have resigned. Such absence may be covered, however by a subsequent grant of leave with or without pay when extenuating circumstances are found to have existed.

OVERTIME AND EXCHANGE TIME

The total exchange time earned by an employee in any one calendar month will expire if not taken by the first of the month one year later. The immediate supervisors will be responsible for scheduling and arranging work periods so that employees under their supervision may take time off and not lose earned exchange time by the limitation. Work on Sunday shall be considered as overtime for all personnel except those whose regularly scheduled work week includes Sunday with some other day in the week off in lieu of Sunday. Work on an employee's regular day off in lieu of Sunday will be considered overtime. Sunday will not be considered overtime for casual emergency employees working less than a scheduled work week and paid on an hourly basis.

All employees on a three step salary range range shall be eligible for cash compensation for overtime. Employees on a six step range who are in a salary range that is not in excess of a beginning rate of $350 for a 40-hour week will be eligible for overtime on an exchange time basis.

Overtime is earned:

a. By working in excess of eight hours in one day.

b. By working in excess of the regular scheduled work week, in which case only the actual time worked at the single rate plus any holiday time off will count toward the work week total.

c. By working on a Sunday on the day designated in lieu of Sunday, except for casual or emergency employees working less than a scheduled work week in which case the compensation will be straight time on an hourly basis.

Only in cases of necessity, emergency, or where the public policy absolutely requires it, may an employee be worked more than 8 hours in any one day or 48 hours in any one week.

Time-off granted to an employee in exchange for time worked outside of his regular working hours, as above provided, will be referred to herein as "exchange time leave." The time worked outside of regular working hours will be referred to as "exchange time worked."

Definition of Terms—The term "civil engineers," as used herein, is understood to embrace all employees engaged in work of an engineering nature, including chainmen, rodmen, and computers, and office assistants in the Engineering Department.

The terms "foremen," "superintendents" and "supervisors" are understood to embrace all employees, regardless of their classifications, having supervision over the work of one or more other employees.

The term "inspector" is understood to embrace all employees engaged in inspection work, including weighmasters.

Reporting of Time Worked and of Leave Taken—When an employee is worked on an exchange time basis, the time worked outside of regular working hours is not to be shown on the time report, but instead, is to be reported on the standard "Report on Exchange Time Worked" (Form A-220), giving the name, the classification, the dates and the numbers of hours, together with a statement explaining the necesity for the extra employment. The original copy of the Report on Exchange Time Worked shall be submitted to the Accounting Division with the time report for the month (or time report period) during which the extra service was rendered.

Exchange time leave taken by the employee in return for exchange time worked shall be reported on the "Statement of Absent Time" (Form A-58), along with other absent time, as described in Section 2, Article 5.

Limitations on Allowance of Exchange Time—The working of employees on an exchange time basis is to be resorted to only as a temporary emergency measure, and the amount of work

performed on that basis shall be held as low as possible.

Work outside of regular working hours is not to be considered exchange time work and is not to be reported as "exchange time worked" unless it is in substantial amount (one hour or more, in the day), and is ordered to be done on an exchange time basis by the person under whose supervision the employee works. The time is to be reported to nearest hour and without the use of fractions. Work outside of regular working hours is not to be reported as exchange time worked, in cases where the offsetting exchange time leave is taken on the same day.

Work outside of regular working hours, not reported with the time report for the month during which it is performed, may not be claimed as exchange time work at a later time.

Exchange Time Leave to be Taken Only When and as Directed—Exchange time leave is to be taken when and as directed by the Department Head, Division Engineer, Maintenance Superintendent, Resident Engineer or other supervisory employe under whose supervision the employee is working. When practicable, the leave should be arranged for and taken within a week or two of the time the extra service is rendered.

Payment for Exchange Time When Authorized—The making of payment to employees, in lieu of the granting of exchange time leave is not ordinarily permissible, but when the interest of the Department may be best served by keeping the employee in continuous service, such payment will, when conditions warrant be authorized. When such payment appears warranted, a request should be addressed to the State Highway Engineer or the Assistant State Highway Engineer, through the proper Staff Engineer or Department Head, setting forth the facts in the case and describing the conditions which prevent the granting of exchange time leave within the required time limit or a reasonable extension thereof. If the request is approved by the State Highway Engineer or the Assistant State Highway Engineer, supplemental pay rolls allowing payment for the exchange time worked may be submitted.

From the above you will note that payment for exchange time is to be regarded as *definitely the exception rather than the rule* and should only be employed as a last resort when it is impossible to grant the employee in question an equivalent amount of time off.

When payment is made for exchange time, the rate of pay per hour will be as determined by the formulas:

Full time employee, 40 hour week $\frac{\text{Monthly Rate}}{160}$

" " " 44 " " $\frac{\text{Monthly Rate}}{176}$

" " " 48 " " $\frac{\text{Monthly Rate}}{192}$

Part time employee, 40 hour week $\frac{\text{Monthly Rate}}{173}$

" " " 44 " " $\frac{\text{Monthly Rate}}{190}$

" " " 48 " " $\frac{\text{Monthly Rate}}{208}$

LEAVE OF ABSENCE COMPUTATIONS

A leave shall be understood to begin with the first day (or half-day) of work performance missed by reason of the leave, and to run until performance of work is again resumed. Week-end days or holidays off immediately preceding a leave are not considered a part of the leave period, but week end days or holidays off at the end of the leave are considered part of the leave.

Deductions shall be made from leave accumulations for all days in the leave period other than Sundays and holidays. However, when the total number of deductible days (excluding Sundays and holidays) is four or less, no deduction will be made for any regular days off that may be included.

When the provisions of the above paragraphs are applied to employees who regularly work on Sunday, the word "Sunday" shall be interpreted to mean the day off that the employee is allowed in place of Sunday.

Vacation Leave to be Accumulative—Vacation leave credit time will be accumulative up to a maximum of twenty-six (26) working days. When the maximum is reached, the crediting of leave time allowance will cease until a reduction in credit occurs by reason of vacation leave being taken.

An employee who has been on leave from the Department for service in the armed forces

of the U. S. Army, Navy or Marine Corps shall, if he returns to the service of the Department immediately following his discharge from the Army, Navy or Marine Corps, be allowed six (6) days of vacation credit as a starting credit at the time of his re-entry into the service of the Department.

Charging for Vacation Leave Taken—When vacation leave is taken, it shall be charged against the employee's vacation leave credit at the rate of one day for each work day in the period of leave.

Vacation Leaves to be Taken Only When and As Approved—Vacation time shall be taken only when and as approved by the Department Head, Division Engineer, Maintenance Superintendent, Resident Engineer or other supervisory employee under whose supervision the employee is working, and it shall be a duty of each supervisory employee to control and schedule the vacations of his employees in such manner as will cause as little interference as possible with the routine performance of the Department's work, and as will hold to a minimum the employment of extra help to substitute for absentees.

In permitting employees to take vacation leave, the supervisory employees should either check with the Accounting Division on the amount of vacation time earned, or should caution the employee that any part of the vacation that is in excess of the earned vacation allowance as determined by the Accounting Division will be "without pay."

Insofar as practicable, vacations shall be allowed only during periods when the work is slack.

Adjustment for Forced Loss of Credit—When an employee is required by his superiors to defer his vacation in order to better serve the needs of the Department, and thereby is subjected to loss of vacation credit by reason of his accumulation of credit having already reached the maximum of 26 days, then, the employee, will, when the Department can permit the vacation to be taken, be allowed an extra day of vacation for each day of credit lost through the deferment. The number of extra days to be so allowed shall not, however, exceed seven, and all must be used within the 60 days which follow the period during which the needs of the Department have prevented the taking of the vacation.

When extra days of vacation are allowed in accordance with the provisions above stated, the time report on which they are carried must be accompanied by a letter from the person responsible for the time report, stating the conditions which have necessitated the deferment of the vacation and giving both the beginning and ending dates of the period during which those conditions prevailed. On the "Statement of Absent Time" which accompanies the pay roll, the extra days shall be listed on a line separate from the regular vacation time of the same employee and shall be marked "Extra Vacation."

Extension of Vacation Time—An employee who extends his vacation beyond the amount of his vacation leave credit shall be considered to have taken a leave of absence without pay for the whole of the extended period. The leave without pay will be subject to the conditions stated herein under "Absence Without Pay."

A vacation shall be extended beyond the amount of vacation credit only when the extension is approved in advance by the Division Engineer and the Staff Engineer or Department Head.

Sickness During Vacation—In cases where sickness or injury is incurred by the employee during a vacation leave period, the time lost due to the sickness or injury shall be charged as vacation time, unless the time lost is three days or more, in which event, if the employee has sick leave time available, the time lost may be charged as sick leave time.

Terminal Vacation Pay—Any employee who is separated from the State service for reasons not reflecting discredit on himself or any employee who is transferred to or employed in another division shall be entitled upon the date of such separation, transfer or acceptance of new employment with the State service, to cash compensation for unused vacation leave. In computing the payment for accrued vacation leave upon separation, the rate for each accrued day shall be 1/25 of the monthly salary rate. In case of death, compensation for vacation earned shall be paid in the same manner that wages and salary due the decedent from the state are paid.

SICK LEAVE

Sick Leave With Pay—Sick Leave shall be earned by each full time salaried employee in the classified service at the rate of one working day for each month of service. The granting of sick leave benefits for employees paid on the basis of hourly rates shall be determined by the director and the budget director on the basis of employment and compensation conditions involved in the classes or positions. Unused sick leave may be accumulated to a total of not more than ninety working days. Employees may utilize their allowances of sick leave when unable to perform their work duties by reason of illness or injury, necessity for medical or dental care, exposure to contagious diseases under circumstances in which the health of the employees with whom associated or members of the public necessarily dealt with would be endangered by attendance on duty, or by illness or death in the immediate family of the employee, for such period as the attendance of the employee shall be necessary. Any employee who is transferred to or is employed by another appointing authority without interruption of his services to the state shall be entitled to credit in the new employment for unused sick leave accrued in the former position. Any sick leave in excess of seven days shall be granted only upon certification of the attending physician or practitioner that such illness or injury prevents the employee from working. Sick leave shall not accrue during any period of leave of absence without pay, the duration of which exceeds fifteen days.

Sick Leave Without Pay—Upon application of any employee, sick leave without pay may be granted for an entire period of disability when earned paid sick leave allowances are not sufficient. When such leave exceeds one year, it may be renewed but the appointing authority or the director from time to time may require that the employee submit a certificate from the attending physician or practitioner. In the event of a failure or refusal to supply such certificate or if the certificate does not clearly show sufficient disability to preclude the employee from the performance of his duties, such sick leave shall be cancelled and the employee's services terminated.

Absence Paid by State Industrial Accident Commission—Any compensation paid for the period of sick leave shall be equal only to the difference between the workmen's compensation received by the employee and the employee's regular salary rate. The total of such sick leave allowance, however, during an extended period of disability may be continued to an amount equal to the total accrued sick leave at full salary rate.

EMERGENCY LEAVE

In accordance with the amended civil service regulations, each employee may be granted leave with pay, for not to exceed two days in each calendar year, "to meet an emergency or for other good unusual cause". Emergency leave taken is to be reported on the Statement of Absent Time, Form A-58, as explained under Article 5. Emergency leave taken is to be included on the time report with the regular working time, and is to be charged to the prefix against which the time of such employee would have been charged, had he worked.

Emergency leave with pay as provided for under "Pay Allowance", Article 6, shall be granted to a new employee only after his employment with the Department has reached a total of three months (during the preceding six months period), and the second day shall be granted only after his employment has reached a total of six months (during the preceding nine months).

An employee leaving the service of the Department will neither be compensated for emergency leave time unused or permitted to apply the same on a leave that does not qualify as an emergency leave.

The pay time and rate of pay to be allowed an employee (monthly rate employee or hourly rate employee) while on emergency leave shall be the same as would be allowed him during the same period had he remained at work in accordance with his regular schedule.

Abuse of the emergency leave privilege shall be cause for dismissal from the service of the Highway Department.

ABSENCE FOR JURY DUTY

Regular employees, including employees paid on an hourly basis, as well as employees paid on a monthly basis, when called on to serve as jurors in any state or federal court, will receive pay while absent on such service, in accordance with the following provisions.

Absence for jury duty (with pay) shall not exceed eleven (11) working days in any one year, unless a longer absence is previously authorized by the State Highway Engineer or the Assistant State Highway Engineer. No absence for jury duty (with pay) will be allowed an employee whose employment with the Highway Department, during the calendar year in which the absence is to occur, is not expected to total at least six (6) months.

From the amount earned by the employee while absent on jury duty, there shall be deducted an amount equal to the amount of "per diem fees" collected (or collectible) for the jury service rendered, it being understood that the per diem fees are as follows:

Justice Court Jury	$1.50
Grand Jury	3.00
Circuit Court Jury:	
(a) While awaiting assignment to panel	2.00
(d) While serving on panel	5.00

The deduction shall be made at the rate of $5.00 per day (Sundays and holidays excepted) unless the time report on which the absent time is shown is accompanied by a written statement from the employee setting forth the exact rates and amounts received for the service.

The pay allowance to be made to an employee while absent for jury duty shall be figured on the same basis as is hereinbefore prescribed for the pay allowance while on sick leave, subject, of course, to deductions as above indicated.

ATTENDANCE AT COURT AS WITNESS

Attendance at Court as a witness may be considered a continuation of the employee's regular employment or may be considered an absence on leave without pay, depending upon the nature of the court case and the class of witness service to be rendered. In this connection, the following schedule shall apply:

1. When the court case involves the Highway Department or some other State department of Oregon, and the employee is called as a witness (either expert or fact witness) because of his connnection with the Highway Department or the State Government, the attendance at Court will be considered a continuation of the employee's regular employment with the Department. He will be carried on the Department's pay roll and will receive the same amount of pay that he would have received had he not been called as a witness. Any witness or other fees earned and collected by him shall be promptly remitted to the Accounting Division through regular channels, accompanied by a suitable letter of explanation.
2. When the court case involves a State Highway contract (as, for instance, a suit between a contractor and a subcontractor), and the employee is called as a witness (either expert or fact witness) because of his connection with the Highway Department, the attendance at Court will be considered a continuation of the employee's regular employment with the Department. He will receive pay and shall dispose of any witness fees collected, the same as stipulated in paragraph 1 above.
3. When the court case is one which does not involve the Highway Department, another State Department of Oregon or a State Highway contract, the attendance at Court shall, if the employee is to serve as an *expert* witness, be considered an absence "without pay." If the employee is to serve as a *fact witness only,* the attendance will be considered an absence "without pay," unless the employee has unused vacation leave time which he desires to have applied on the absence, in which event, the application of such unused vacation leave time will be permissible.

An employee shall not voluntarily consent to serve as a witness (either expert witness or fact witness), unless such service has the prior approval of the supervisory employer under whom the employee works. If the case is one in which another State department is involved, or one involving expert testimony, it will be necessary for him to secure, also, the prior approval of the State Highway Engineer or the Assistant State Highway Engineer.

When an employee is required by subpoena to serve as a witness, it shall be the duty of the employee to give notice of the subpoena to his superior immediately upon receipt of the subpoena, so that provision for the absence may be made.

When an employee serves as a witness on a case involving the Highway Department, another State department or a State Highway contract, or on any case in which he is permitted to draw his regular salary or wage, he shall not be allowed to retain any fee for such service.

The pay allowances to be made an employee while serving as a court witness in accordance with the foregoing provisions shall be figured on the same basis as is prescribed for pay allowance while on sick leave, subject, of course, to deductions as above indicated.

The foregoing provisions in regard to service as witness shall apply to hourly rate employees as well as to monthly rate employees.

TRAINING CAMP LEAVES

Employees who are members of the National Guard or of the reserve forces of the Army or Navy will be allowed leaves of absence for such periods as they may, necessarily, be absent for ordered attendance at annual encampments, field exercises and training schools.

For those employees whose employment with the Highway Commission, during the calendar year, has exceeded or is expected to exceed six months, these leaves will be leaves "with pay" (and without loss of vacation) for periods totaling not more than twelve (12) working days in any one calendar year. Leave time in excess of twelve (12) working days in any one calendar year shall be "without pay," except as such excess time may be absorbed in vacation leave time to which the employee may be entitled.

For those employees whose employment with the Highway Commission, during the calendar year, is not expected to exceed six months, the leaves will be leaves "without pay," except for such of the leave time as may be absorbed in vacation leave time to which the employee may be entitled.

The pay allowance to be made an employee while on training camp leave in accordance with these provisions shall be figured on the same basis as is prescribed for pay allowance while on sick leave.

Employees expecting to utilize leaves of absence under these provisions shall give notice to the person, under whose supervision they are employed, at least two weeks in advance of the date on which the leave is to begin.

Employees taking leave under these provisions shall submit orders or statements from the appropriate military officers as evidence of required service, which orders or statements shall show the beginning and ending dates of the period served or to be served. The orders or statements here referred to shall be transmitted to the Salem Office attached to the "Statement of Absent Time" (Form A-58) which is regularly required to be submitted with pay rolls.

LEAVES FOR SERVICE IN ARMY OR NAVY

An employee leaving the Department for temporary service in the armed forces of the United States Army, Navy or Marine Corps, voluntarily or otherwise, will be considered to be on a "leave without pay," for the period of such temporary service, and upon termination of such service will be entitled to reinstatement in the Department in the position occupied at the time of leaving, or in a position of equal rating, without loss of seniority.

When an employee is to leave for such temporary service, the supervisory employee in charge shall notify the Personal Director at Salem, giving the name and address of the employee. The employe will then be furnished with a letter from the State Highway Engineer or the Assistant State Highway Engineer advising him personally of the understanding in regard to the reinstatement.

In employing persons and advancing employees to replace employees called for military service, or to fill vacancies caused by advancements made to replace such employees, it will be the duty of the supervisory employee to instruct the persons employed or advanced that their employment or advancement is temporary only and will terminate upon the return to the Department of the employees whose leave made the employment or advancement possible. It will be their duty, also, to notify the Personnel Director of each employment or advancement made under the above conditions so that a permanent record will be available for use when the service men return. This notification may be made by making a suitable statement on the wage rate approval form for the employee affected.

ABSENCE WITHOUT PAY

Whenever a person employed on a monthly rate basis returns to work on a Monday (or on a day following a holiday), after having been for a time without pay, his pay time will start with Monday (or the day following the holiday), and not with Saturday afternnon, Sunday or the holiday, except in cases where the absence

without pay, when figured on the above basis, would be only 4 days or less; in which event the Sunday and/or the holiday (but not the Saturday afternoon) may be included in the pay time.

In applying the provisions of the above paragraph, it shall be understood that if the day on which the employee resumes his duties is the first work day of a *month which has begun on a Sunday or a holiday,* the employee will be allowed pay for the Sunday and/or the holiday with which the month began.

The theory on which the understanding stated in the above paragraph is based is that, inasmuch as the employee is paid on a monthly rate basis, each month must be considered more or less separately from other months, and that if the employee has worked every working day in a given month, he should be paid for the full month. Under the same theory, a monthly employee who begins an absence (which is to be without pay) after having worked all of the working time up to the end of the month, should be paid for the Saturday afternoon, the Sunday, and/or the holiday occurring on the last day or days of the month.

Whenever an absence is partly "with pay" and partly "without pay," the whole of the "with pay" time shall run first, and shall be entirely consumed before the "without pay" time commences.

Article 3—Preparation of Time Reports

Form A-248 is to be used in the preparation of time reports in duplicate for the offices of the Construction Department.

When the time report has been totaled and summarized, the person who prepared the time report is to sign each copy, and the person in charge of the office or crew is to sign likewise, certifying to the correctness and proper charge and then forward the original to the Accounting Division, Salem.

The original of the time report of a Division Office is to be forwarded to the Maintenance Engineer. The Maintenance Engineer is to sign his approval on the back of the original and forward to the Accounting Division.

Persons authorized to sign and approve time reports are:

Division Offices—Division Engineer and Assistant Division Engineers and Division Office Engineers.

Construction Engineering Crews—Resident Engineer, Division Engineer, and Assistant Division Engineer.

Survey Parties—Locating Engineer, Division Engineer, and Assistant Division Engineer.

When omission of a required signature is made necessary by sickness, extended absence or other cause, the time report shall be accompanied by a letter explaining the circumstance.

Early Submission of Time Reports Required —The work of checking time reports and issuing pay checks in the Accounting Division is a task of considerable magnitude, and, for its expeditious performance, resident and locating engineers must submit their time reports to the Division Office in time to reach the Accounting Division not later than the 25th day of the month.

When time reports are submitted before the end of the month as above required, pay time for the days subsequent to submission is to be shown as anticipated. In case the actual time worked differs from that shown, particulars in regard to the change are to be forwarded to the Accounting Division, Salem, by night letter or telephone 4-2171, Extension 205, not later than the last day of the calendar month.

The persons by whom time reports are to be signed shall so arrange their schedules that they will be at their respective offices on the day or days that time reports are scheduled for submission, so that the time reports may be signed and forwarded without delay.

GENERAL TIME REPORT INSTRUCTIONS

In writing names of employees on the time reports, first list the name of the engineer in charge, then the employee's name in alphabetical order within each civil service classification number, which should appear on the time reports in numerical sequence.

Write the given name first, then the initial only of the middle name, then the surname, thus —George R. Doe. Always write the name in the same manner correctly on each time report and do not abbreviate given names. In case an employee signs his middle name, write the initial only of the first name, then the middle name, then the surname, thus—T. John Roe.

A separate time report is to be submitted for each crew.

To identify the time report, the name of the crew should be shown at the top of the first sheet.

The classification shown for an employee must be the classification which most nearly conforms with the duties actually performed. There must be no carrying of employees under classifications which do not correctly indicate the nature of the work performed.

The time of employees paid in part by time check should be shown on the time report in exactly the same manner as the time of employes not time-checked. Also, the number of the time check should be listed in the columns provided for that purpose at the right hand end of the time report form.

The amounts earned by time-checked employees should be included in the time report totals and in the cost distribution the same as the amounts earned by employees not time-checked.

Mandatory deductions from an employee's pay, to cover accident insurance, withholding taxes, and retirement contributions, and voluntary deductions for hospital insurance, group insurance, and savings bonds, will be computed by the Accounting Division.

Deductions for industrial accident insurance, at the rate of one cent per day for each day worked or fraction thereof, shall be made from all employees paid on an hourly or daily basis. For employees paid on a monthly or semi-monthly basis, the deduction shall be made at the rate of one cent per day straight time, Sundays and holidays included. Deduction at one cent per day is not to be made on vacation or sick leave time.

For employees holding membership in hospital associations, deductions shall be made each month for the total amount of monthly dues regardless of the number of days worked.

Manner of Indicating Days or Hours Worked—The regular pay time of monthly employees who have worked the full month should be indicated on the time report by writing the words "Full Month" or by marking with the symbol X all the days in the month, Sundays and holidays included.

The regular pay time for monthly employees who have worked fractional months may be indicated by marking with the symbol X all days, Sundays and holidays included, during the part of the month that they have worked, excepting, of course, any days on which, for any reason, they may not have been entitled to payment.

Article 4—Hours of Employment and Overtime

a. *Exempted Employees*—Employees exempted from the provisions of the eight-hour law and who, therefore, may work more than eight hours per day without payment of overtime include (1) watchmen, (2) timekeepers, (3) foremen, (4) superintendents, (5) civil engineers, (6) supervisors, (7) inspectors, (8) checkers, and other employees whose duties consist of, or include, the supervising and directing of the work of other employees.

The term "civil engineers", as used herein, is understood to embrace all employees engaged in work of an engineering nature, including chainmen, rodmen, and computors, and office assistants in the Engineering Department.

The term "foremen," "superintendents" and "supervisors" are understood to embrace all employees, regardless of their classification, having supervision over the work of one or more employees.

The term "inspector" is understood to embrace all employees engaged in inspection work, including weighmasters.

b. *Overtime Work to be Avoided*—Only in cases of extreme emergency shall an employee be required or permitted to work more than eight (8) hours in any one day or more than forty-eight (48) hours in any one calendar week.

Employees who may offer or who may voluntarily undertake to work more than eight hours in any one day shall be instructed not to do so, and failure to comply with such instruction shall constitute cause for dismissal.

c. *Definitions and Explanations*—Time required by an employee in traveling between headquarters and the place of work, i. e., the office and the job, at the beginning and the end of the daily shift, shall be considered pay time, except in those cases where the job lies at considerable distance from headquarters and when, for the convenience of the employees, they are permitted to drive rather than move to a new headquarters location.

Performance of a few minutes of work after quitting time, in putting away tools and otherwise closing out the day's work, will not be considered overtime unless regularly required.

Work on a Sunday or a holiday, to an amount not exceeding eight hours, can be classed as work within regular hours, provided the total working time for the calendar week does not exceed forty-eight (48) hours. It is, therefore, suggested that when work on Sundays or holidays cannot be avoided, in order to reduce payment of overtime or to avoid exchange time, that the employee be allowed time off on other days of the same week to hold the total for the week below forty-eight (48) hours. (See "Exchange Time", Art. 2.)

Work on Saturday afternoon can be classed as work within regular hours, provided it does not increase the total for the day to more than eight (8) hours or the total for the week to more than forty-eight (48) hours.

Necessary work evenings and after hours can be taken care of, without payment of overtime, when anticipated, by giving a corresponding amount of time off during the regular working hours of the *same* day. Work in excess of eight (8) hours on one day cannot, however, be balanced by giving time off on another day, except in the case of employees entitled to exchange time.

The calendar week shall be understood to begin at midnight Saturday night.

d. *Payment of Overtime*—Whenever an employee is required or permitted to work more than eight (8) hours in one day or more than forty-eight (48) hours in one calendar week, the working time in excess of eight (8) hours or forty-eight (48) hours, as the case may be, shall be paid for as "overtime," except in the case of employees entitled to exchange time.

Pay time or overtime is to be computed to the nearest half hour. Fractional hours are to be indicated on the time report by the fraction ½. Other fractions or decimals are not to be used.

See Section 2, Article 3, for manner of showing overtime on the time report.

Article 5—Instruction Applicable to All Classes of Absent Time

Time Reports and Cost Distribution—All absent time *for which payment is to be allowed,* in accordance with the foregoing provisions, shall be entered on the time report the same as working time.

Vacation leaves and sick leaves shall be charged on the time report against special "Service Accounts," the prefixes and account numbers to be used to be as stated in Section 2, Article 6.

Absences, other than vacation leaves and sick leaves, shall be charged to the work on which the employee is engaged at the time the absence occurs, using the work prefixes and account numbers the same as though the time had been working time.

Certificates and Absent Time Statements—The engineer or other person responsible for the preparation of a time report shall keep an accurate record of all absences from duty and shall sign, on the last sheet of all copies of each time report the printed form of "Certificate of Absent Time," in which he certifies, (1) that no absent time is included in the time report as pay time, or (2) that no absent time is included as the pay time on the time report other than that shown on the Statement of Absent Time (Form A-58), which he will submit as hereinafter provided, and that the absent time included as pay time on the time report is not in excess of the accumulated absent time credits of the respective employees.

In affixing the signature on the certificate of absent time, sign only that portion which correctly describes the conditions applying to the particular time report.

When absent time is included in any time report there shall be submitted for that time report a "Statement of Absent Time," covering absent time of monthly rate employees. This statement shall be prepared on Form No. A-58.

The duplicate copy shall be retained by the person who prepares the time report; the original copy shall be sent to the Accounting Division, as follows:

(a) For time reports which are forwarded to the Accounting Division before the end of the month, as in the case with administrative and engineering time reports, the absent time statement (Form A-58) shall be prepared and forwarded the last day of the month.

(b) For time reports forwarded on or after the last day of the month, the absent time statement (Form A-58) shall be submitted with the time report.

No wage or salary payment will be made by the Accounting Division until the absent time statement applicable thereto is received and checked. Any allowance of pay for leave time to which the employee is not entitled will be deducted before the pay check is forwarded.

The certificate of absent time, as printed on the time report form, and the statement of absent time on Form A-58 are to bear signatures as follows:

Kind of crew—
- Resident Engineer's crew
- Locating Engineer's crew

Signature required on statement of absent time—
- Resident Engineer
- Locating Engineer

Signatures required on certificate of absent time (Form A-58)—
- Resident Engineer and Assistant Division Engineer or Division Engineer
- Locating Engineer and Assistant Division Engineer or Division Engineer

Recording and Reporting of Absences—As the equitable application of the Department's policies with reference to vacations, sick leaves, and other absences is dependent upon an infallible recording and reporting of absences, each person responsible for the preparation and submission of a time report shall put into operation a system of obtaining and recording information in regard to absences which will enable him to report every absence accurately and under the proper classification. Failure to so report an absence shall be looked upon as an offense quite as serious as the payment of persons for service not rendered, and such failure shall be cause for the dismissal of the person responsible for the failure.

It is suggested that a record of absences be kept on a standard time report form or in a monthly time book, and that entries be made in this record daily to insure accuracy. A file of copies of the "Statements of Absent Time" will provide the needed record of leaves taken.

Definition of Non-work Day—The term non-work day as used herein shall be understood to be a day on which the employee, under his regular working schedule, is not expected to work.

Under the amended civil service regulations, Saturday is considered a "work day" for employees who are on a five-day week schedule. Except as stated in the sentence following, Saturdays occurring within the leave period are to be included in the vacation leave column on the Statement of Absent Time. When the total number of days in the leave period, other than Sundays and holidays, is four or less, Saturdays are to be reported in the "Non-work Days" column of the Statement of Absent Time.

Computation of Leave Credits—In the computing of vacation leave credits and sick leave credits, all time that the employee is absent on authorized leave with pay may be included as time worked.

If a vacation leave or a sick leave being taken runs far enough into the month to entitle the employee to a day of credit for that month, the day of credit may be utilized in the leave then being taken.

Deductions from Leave Credits—Deductions shall be made from leave accumulations for all days in the leave period other than Sundays and holidays, excepting only that when the total number of deductible days, figured on that basis is four (4) or less, no deduction will be made for any regular day off that may be included.

Saturdays occurring within a sick leave period of any duration for employees on a five-day week schedule are not included in the sick leave column but must be shown in the "Non-work Days" column, and will not be deducted from sick leave accumulations.

Leave Credits to be Checked Before Allowance—To avoid misunderstanding and disappointment to the employee, the Department Head or other supervisory employee in charge should, before permitting any leave, check with the Accounting Division at Salem as to the eligibility of the employee for the leave and as to the amount of leave time to which the employee is entitled. Persons authorized to issue time statements and field checks are cautioned particularly against allowing payment for leave time without first checking with the Accounting Division, as any erroneous payment for leave time will have to be made good by the person issuing the time statement.

Article 6—Accounting Procedure, Vacations and Sick Leave

Charges for Vacation Leaves Taken—Charges for vacation leaves taken will be handled on the time reports and in the time report summaries in the same manner as charges for working time, except that vacation leave time will be charged to the special vacations account under the item designated "Vacation leave taken." The prefixes

and function numbers to be used in charging vacation leave time taken are as follows:

1. Time reports of Maintenance Department, including shop and maintenance offices, oiling crews, paving crews, and extra gangs 8001–568
2. Time reports of survey parties and construction engineering crews 8011–568
3. Time reports of all other departments and crews 8021–568

In the detail of the time report, the days or hours of vacation leave time taken by an employee are to be entered the same as other pay time of the same employee, using a separate line, of course, to show proper segregation of cost. The amount due an employee for vacation leave taken shall be included in the amount shown in the "gross amount earned" column.

Means of Reflecting Vacations Costs in Cost of Projects and Work Units—In order that the expense of giving vacations may be properly reflected in the costs of projects and other work units, a monthly charge will be made against each project and work unit. The amount of the monthly charge will be determined from the time reports at the time the time reports are prepared, and the charge will be shown in the cost distribution summary on the back of the time report. The amount of the charge will be a percentage of the amount of time report charged to the project or work unit.

The percentage rate to be used in computing the charges, and the manner in which the charges are to be shown in the time report cost summaries will be as described hereinafter under appropriate subheadings.

The charges to projects and work units will hereinafter be referred to as "vacation percentage charges."

Charges for Sick Leave Taken—Charges for sick leave taken will be handled on the time reports and in the time report distribution in the same manner as charges for working time, except that sick leave time will be charged to the special sick leave accounts under the item designation "Sick Leave Taken." The prefixes and function numbers to be used in charging sick leave taken are as follows:

1. Time reports of Maintenance Department, including shop and maintenance offices, oiling crews, paving crews, and extra gangs 8101–568
2. Time reports of survey parties and construction engineering crews 8111–568
3. Time reports of all other departments and crews 8121–568

In the detail of the time report, the days or hours of sick leave time taken by an employee are to be entered the same as other pay time of the same employee, using a separate line, of course, to show proper segregation of cost. The amount due an employee for sick leave taken shall be included in the amount shown in the "Gross Amount Earned" column.

Means of Reflecting Sick Leave Costs in Cost of Projects and Work Units—The expense of sick leaves will be reflected in the costs of projects and work units by a procedure the same as hereinbefore described for vacations.

Percentage Rates to be Used—The percentage rates to be used in determining the amounts of "vacation percentage charges," and "sick leave percentage charges," to be made against the work by adding to the charge items in the time report cost summaries, will be subject to change from year to year. The percentages to be used until further notice are as shown below:

	Vacation Percentage	*Sick Leave Percentage*	*Combined Percentage*
1. Time reports of Maintenance Department including shop and maintenance offices, oiling crews, paving crews, extra gangs, Weighmasters and Bridge operator	6.3%	2.2%	8.5%
2. Time reports of survey parties and construction engineering crews	5.7%	1.3%	7.0%
3. Time reports of all other departments and crews	6.5%	1.5%	8.0%

The vacation and sick leave percentage charges are to be computed as one amount on the time report summaries.

Vacation leave taken and sick leave taken, are to be shown separately.

The above stated percentages include an

allowance to cover the employer's portion of industrial accident insurance applicable to such leave time.

No Percentage Charge to be Made on Vacation and Sick Leave Time—The percentage charges for vacations and sick leave are to be made against all charge items in the time report, except charges for "vacation leave taken" and "sick leave taken." No percentage is to be added on these two particular kinds of charges.

Industrial Accident Insurance on Vacation Leave Time and Sick Leave Time—In determining the amounts to be deducted on the time report for the employee's contributions to the Industrial Accident Insurance Fund, no deduction should be included for the days that an employee is absent on vacation leave, or on sick leave.

Cost Distribution for Sundays and Holidays Occurring in Vacation or Sick Leave Periods—In the case of monthly rate employees, non-work days occurring immediately before, or at the beginning of a vacation or sick leave, are not to be charged as a part of the vacation or sick leave time. For such non-work days, the charge is to be made against the work on which the employee was engaged immediately prior to the leave. Non-work days occurring midway in the vacation leave period or sick leave period, or at the end of the leave period, shall be included with the time to be charged to the "vacations account" or "sick leave account."

Non-work days shall be understood to include Sundays and holidays, and other time, if any, such as Saturday afternoons, which is not regular work time under the time report concerned.

The charging of vacation leave time to the "vacations account," or the charging of sick leave to the "sick leave account," shall begin with the first regular working day of the leave period, and not earlier.

Pay Allowance—When an employee's services are terminated, the amount of his unused vacation credits as of the date of termination, are to be paid in cash. Except in the case of an emergency, an employee whose services are terminated, will be expected to take his vacation prior to the date of termination. In the case of an emergency, where it is not possible to permit an employee to take his vacation prior to the date of termination, because of the pressing condition of the work, the amount of unused vacation credits are to be paid in cash. The vacation time of an employee in this case, is to be know as "Terminal Vacation Leave".

When an employee takes his vacation prior to the date of termination, the date of termination shown on the personnel action form is to include the vacation time and the words "Includes vac." are to be written after the termination date on the personnel action. When an employee's services are terminated, and the vacation time is to be paid in cash, the date of termination is *not* to include the vacation time, and the words "Includes vac." are *not* to be written in. Please exercise due care in reporting the date of termination as explained in this paragraph so that there will be no misinterpretation in the processing of the employee's time.

When the unused vacation time of an employee is to be paid in cash as of the date of termination, subject to the instructions in the two preceding paragraphs, the amount of vacation time is to be shown on a separate line on the time report, opposite the respective prefix for the vacation leave taken account, and the words "terminal vacation leave" are to be written through the date columns. The dates of the vacation time need not be shown in the date columns. This will avoid complications in the event the terminal vacation time of an employee extends beyond the end of the month for which his regular working time is reported.

The amount of pay time, other than terminal vacation leave, of a monthly-rate employee is to be computed at the regular pay rate on the basis of the number of days in the calendar month.

The terminal vacation leave of a monthly-rate employee, is to be computed on the basis of a work-month of 25 days.

The number of days of terminal vacation leave of a monthly-rate employee, is to be shown in the "Total Days; Hours" column on the time report. The regular pay rate divided by 25, and multiplied by the number of days will be the amount of terminal vacation leave, to be extended in the "Amount at Rate" column on the time report. For example, an employee works on three prefixes, 12 days in a 30-day

month, his unused vacation credits amount to 16 days, and his rate of pay is $250.00 per month. The time of this employee is to be shown on the time report as follows:

	Total Days	Rate of pay	Amount at rate	Gross amount earned
Prefix 1 xx	2	$250.00	$ 16.67	
Prefix 2 xxxxxxx	7		58.33	
Prefix 3 xxx	3		25.00	
8011–568 Terminal vacation leave	16	250.00	160.00	$260.00

The amount of pay time, other than terminal vacation leave, of an hourly rate employee is to be computed on the total number of hours worked during the month.

The rate of pay of the terminal vacation leave of an hourly-rate employee, is to be the daily rate equivalent of his regular hourly rate, obtained by multiplying his regular hourly rate by 8. The number of days of terminal vacation leave of an hourly-rate employee, is to be shown in the "Total Days; Hours" column on the (monthly) time report. The daily rate equivalent of the regular hourly rate is to be shown in the "Rate of Pay" column, and the extension of the number of days of terminal vacation leave multiplied by the daily rate (equivalent of hourly rate) is to be shown in the "Amount at Rate" column on the (monthly) time report. For example, an employee works 100 hours on regular time in a month, his unused vacation credits amount to 20 days, and his rate of pay is $1.00 per hour. The time of this employee is to be shown on the monthly time report as follows:

	Total Days; Hours	Rate of pay	Amount at rate	Gross amount earned
Regular time (Distributed by hours in date column)	100	$1.00	$100.00	
Vac. leave Terminal vacation leave	20	8.00	160.00	$260.00

Your attention is directed to the fact that only terminal vacation leave of a monthly-rate employee is to be paid on the basis of a work-month of 25 days. The vacation of a monthly-rate employee continuing in service, or of a monthly-rate employee who takes his vacation prior to the date of termination, is to be paid on the basis of the total number of days in the calendar month.

When an employee has terminal vacation leave, the absent time included in such leave period paid for in cash is to be shown on a separate line on the Statement of Absent Time. The first date of the terminal vacation leave period is to be shown in the "Period of Absence-From" column, and the letters "TVL" (indicating terminal vacation leave) are to be shown in the "Period of Absence-To" column. The total number of days of vacation time paid is to be shown in the "Total Absent Time-Days" column, and also in the "Vacation Leave" column.

The rate of pay to be allowed an employee while on sick leave shall be the same as would be allowed him during the same period if he worked.

LOST TIME OCCASIONED BY INJURY

Persons responsible for the preparation of the report of injury to the State Industrial Accident Commission, are to forward a copy of each report to the Accounting Division. (See Sec. 3, Art. 7.)

The compensation made to the employee by the Accident Commission for time lost on account of injury, will cover the full period of injury, when such injury occurs in line of duty, regardless of any sick leave allowance that may be made to the employee by the Highway Department.

Checks Issued by Accident Commission—Copies of all checks issued by the Accident Commission as compensation for lost time resulting

from injury, will be forwarded by the Accident Commission directly to the Accounting Division. The details of the checks will be recorded, and the data will be used as a basis for the computation of pay time of the employee in cases where the lost time is applied to sick leave credits.

Time Report Covering Period of Injury—The time lost by an employee by reason of injury while in line of duty will be charged as pay time and applied against an employee's sick leave credit. Such employee shall be carried on the regular time report to within the nearest half-day of the time of injury. *From the time of injury until he returns to work, or until his sick leave credit is exhausted, the employee shall be carried on a separate time report at his regular rate to the extent of his sick leave credit* during the period of injury, as explained hereinafter. The amount paid the employee by the Accident Commission will be deducted by the Accounting Division from the pay time shown on the separate time reports thus submitted.

Charging for Sick Leave in Injury Cases—In the case of sick leave absence occasioned by injury in the line of duty, the charge against the employee's accumulation of sick leave credit will be made at only one-half the usual rate. That is, the charge will be made at the rate of only one-half day for each regular working day of absence. This reduction is made for the reason that in absences of that kind, the Highway Department pays only a part of the employee's compensation.

In the event that the number of days of pay time to be charged to the employee's sick leave credit, as computed under the foregoing provision, is in excess of the employee's sick leave credit, the employee is to be removed from the time report at the time that the sick leave credit has been completely used. In case the employee is reemployed following his period of lost time occasioned by injury, he is to be reinstated on the time report on the date he returns to work.

Employees Having No Sick Leave Credit—An employee who has no accumulated sick leave credit at the time of injury while on duty shall be removed from the time report as of the date and hour of the injury. In case the employee is reemployed following his period of lost time occasioned by injury, he is to be reinstated on the time report on the date he returns to work.

Time Report Procedure—The following changes are to be made in the usual time report procedure, to report lost time of employees injured while in line of duty, when such time is to be applied to sick leave credits:

1. In the case of a monthly rate employee carried on a monthly rate time report, a separate time report and a separate statement of absent time are to be submitted for the period from the time of injury (to the nearest half day) to the time such employee returns to work, or until his sick leave credit has been exhausted.
2. In the case of an employee who is carried on an hourly rate time report, except as provided in the next sentence, a separate foreman's weekly time report, a separate monthly time report, and a separate statement of absent time are to be submittted for the period as explained in "1" above. In the case of a repair shop employee who is carried on an hourly rate time report, a separate foreman's weekly time report is not required.
   (Note: Each of the foregoing documents that is required to be submitted is to be marked "Time lost on account of injury".)
3. The following figures will be computed by the Accounting Division, and are not to be indicated by the field offices:
   a. The amount earned, on the foreman's weekly time report covering time lost on account of injury.
   b. The gross amount earned, and the net amount due, on the time reports covering time lost on account of injury.

The Accounting Division will advise the field offices as to the amount charged to the jobs when the special time reports are completed.

EXCHANGE TIME

In accordance with the provisions of Section 2, Article 2, exchange time worked is to be reported on Form A-220, "Report of Exchange Time Worked." One report is to be prepared for each time report on which employees, having worked exchange time, are listed. The report is to be prepared in the same number of copies, and the copies are to be signed, approved and forwarded in the same manner, as the Statement of Absent Time (Form A-58), described in Section 2, Article 4. In reporting the amount of exchange time worked, the number of hours only is to be shown; do not show the number of days.

Exchange time leave is to be reported on Form A-58, "Statement of Absent Time" as explained in Article 5, herein.

GENERAL INSTRUCTIONS

Statement of Absent Time—In the event that different types of absences of one employee run concurrently, each type of absence and the corresponding dates of each type of absence are to be shown on separate lines on the "Statement of Absent Time, Form A-58.

The number of hours exchange time leave is to be shown in the column "Exch. Time Leave."

Documents to be Submitted with Time Report—The following documents pertaining to absent times are to be submitted with the time report:

1. Statement of Absent Time.
2. Report of Exchange Time Worked.
3. Physician's Certificate for sick leave taken in excess of seven days.
4. Letter of explanation supporting extra vacation leave taken.

Article 7—Accounting Procedure for Withholding Tax Deductions

Record of Employees Exemption Status—Each employee is required to submit to the person responsible for preparing the time report, his marital and dependency status, on form W-4 (Rev. 1948), which is the form supplied by the Internal Revenue Service. The person responsible for preparing the time report shall record the exemption of each of his employees in a memorandum record containing the name of the employee and his exemption status in accordance with the following code:

	Code Number
Person claiming:	
No exemption	O
One exemption	I
Two exemptions	II
Three exemptions	III
(Etc. to ten)	(Etc. to X)

Employees who fail to submit form W-4 (Rev. 1948), to the person responsible for preparing the time report, will not be entitled to any exemption, and the withholding tax in that event will be computed by the Accounting Division on the whole of the gross income until the exemption certificate is submitted.

In the event that the exemption status of an employee changes at any time, a new exemption certificate must be submitted by the employee. The new exemption is to take effect as of the beginning of the time report period during which the certificate is submitted provided the certificate reaches the Accounting Division on or before the twenty-fifth day of the period.

Withholding tax deductions will be made from all persons employed, regardless of classification or length of employment.

Withholding Tax Not Applicable to Compensation for Injuries—Inasmuch as the compensation paid by the State Accident Commission for time lost on account of injury is a return of premium paid for insurance, no withholding tax will be levied against compensation received by an employe from the Accident Commission. The withholding tax deduction will be figured on the net amount to be paid the employee on the Highway Department time report.

Article 8—Time Statements

a. *Persons Authorized to Issue Time Statements*—The persons by whom time statements may be issued and the offices authorized to make payment on the time statements issued by such persons are as follows:

Persons Authorized to Issue Time Statements	*Office Authorized to Make Payment*	
Resident Engineers	Division Office	
Locating Engineers	"	"
Division Engineers	"	"
Office Engineers in Division Offices	"	"
Assistant Division Engineers	"	"

Each person authorized to issue time statements shall be bonded in such amount as the State Highway Engineer may direct, but, in no case, in an amount less than the minimum required.

b. *Limits of Authority*—Persons authorized to issue time statements shall issue time statements only to persons carried on the time reports which are made up in their respective offices.

Persons authorized to make payment on time statements shall limit their payments to time statements, issued within their respective districts or divisions by certain persons as indicated above under the heading "Persons Authorized to Issue Time Statements."

Time statements issued in the field will not be accepted for payment in the Accounting Division at Salem, except statements for final payment.

c. *Time Statement Forms*—Forms on which to prepare time statements will be supplied to

authorized persons on letter requisition addressed to the attention of the Accounting Division at the Salem office. The forms, number A-198, are numbered serially, and each individual will be held personally responsible for the safekeeping of all forms supplied him and shall account for each numbered form.

When forms are spoiled in preparation, or otherwise made unfit for use, the word "spoiled" shall be written plainly on the face of each copy, and the original copy shall be returned to the Accounting Division for credit. The duplicate copy will be sent to the office from which the pay check would normally have been issued, and there filed with the duplicate copies of paid time statements.

Forms used in issuing time statements will be credited to the person to whom they were originally supplied when the time statements reach the Accounting Division at Salem.

Time statement forms supplied to Division Engineers may be isued by either the Division Engineer, Assistant Division Engineer or the Office Engineer in the Division Office. Time statement forms will not be supplied to office engineers in division offices.

d. *Preparation of Time Statements*—Time statements shall be prepared in triplicate. All required information, except signatures, shall be written or lettered with indelible copying pencil, and all signatures shall be written in ink on all three copies.

Care shall be exercised to avoid errors and omissions which will result in overpayment. *Overpayments made on a time statement will be charged to the person issuing the statement.*

Cost distribution need not be shown on time statements.

Time statements shall bear the signature of the payee. If the payee should not be at hand to sign, the statement shall be mailed to him for his signature.

In addition to the signature of the payee, the time statement shall bear other signatures as follows:

Person Issuing Statement	*Required Signatures*
Resident Engineer ..	Resident Engineer Division Office Engineer Division Engineer, or Ass't Division Engineeer
Locating Engineer ..	Locating Engineer Division Office Engineer Division Engineer, or Ass't Division Engineer
Division Engineer ..	Division Office Engineer Division Engineer, or Ass't Division Engineer
Division Office Engineer	Division Office Engineer Division Engineer, or Ass't Division Engineer
Ass't Division Engineer	Ass't Division Engineer Division Office Engineer Division Engineer, or Ass't Division Engineer

No erasure should be made on any time statement. If an error is made, each of the three copies of the statement shall be plainly marked "spoiled", and the original copy sent immediately to the Accounting Division at Salem for credit. Do not, under any condition, destroy or lose a time statement form.

Each of the three copies of a time statement shall bear the impressed seal of the person by whom the statement is issued, and the original and duplicate copies of the time statement shall bear the impressed seal of the person by whom the pay check is signed.

In case the payee plans to call for his pay check at the office at which the check is to be issued, the payee shall, unless he is personally known to the paying officer, be provided with a signature certification slip prepared on form No. 507. This slip shall be taken up by the person who makes delivery of the check and shall later be filed with the duplicate copy of the time statement.

e. *Original Copy of Time Statement to Serve as Authority for Issuance of Pay Check*—The original copy of the time statement shall serve as an order for the issuance of a time check. That copy shall be delivered to the person authorized to make payment by one of the following means:

1. By personal delivery by the person issuing the time statement.
2. By messenger, when the messenger is personally known to the paying officer and when the paying officer has personal knowledge of the employee in whose favor the time statement is drawn and of the service for which he is to be paid.
3. By registered mail (return receipt to be requested).

The paying officer shall not honor a time statement delivered to him by the payee or by a person claiming to be the payee. Neither shall the paying officer honor a time statement delivered to him by a messenger unless the con-

ditions stated in numbered paragraph 2 above are fully complied with.

As soon as the time check is written, the word "paid" shall be stamped on the face of the time statement with the rubber stamp furnished for that purpose.

If the time check is issued from the Division Office, the original copy of the time statement (stamped "paid") shall, following issuance of the check, be forwarded to the Accounting Division at Salem.

The original copy of the paid time statement shall be forwarded to Salem from the Division Office on the day on which it is issued or received, or as soon thereafter as it is possible to obtain the signature of the Division Engineer, or Assistant Division Engineer.

f. *Disposition of Duplicate and Triplicate Copies of Time Statements*—The duplicate copy of the time statement shall be forwarded (with the original copy) to the office by which the time check is to be issued and shall there be stamped "paid" and filed as evidence of the authority under which the time check was issued.

The triplicate copy of the time statement shall be left in the time statement book and held by the issuing office until all forms in the book have been used, at which time the entire book shall be sent to the Accounting Division at Salem for permanent filing.

When crews are disbanded, all time statement books on hand shall be turned in to the Accounting Division at Salem. Books used infrequently will be called into the Accounting Division for audit and return at intervals not exceeding one year.

Article 9—Time Checks

a. *Persons Authorized to Issue Time Checks*—The following persons, and no others, are authorized under the conditions stated hereinafter to draw checks on the State Treasurer for emergency payments to employees of the Department:

1. State Highway Engineer.
2. Assistant to Comptroller.
3. Pay Roll Supervisor in Salem Office.
4. Division Engineers.
5. Assistant Division Engineers.
6. Office Engineers in Division Offices.
7. District Maintenance Superintendents.
8. Shop Superintendents in Branch Shops.

The authority of Division Engineers, Assistant Division Engineers, Office Engineers in Division Offices, District Maintenance Superintendents and Shop Superintendents is limited to the drawing of checks to make payments on time statements issued by themselves or by authorized persons employed under their supervision. The persons named are not authorized to issue checks to make regular time report payments or to make payment for purchases of any kind.

All checks issued to make payment on time statements shall be called "time checks".

b. *Pay Check Forms*—Forms on which to draw time checks will be supplied to authorized persons on letter requisition addressed to the attention of the Accounting Division at Salem. The forms will be numbered serially, and each individual will be held personally responsible for the safe-keeping of all forms supplied him and shall account for each numbered form. When a form is spoiled in preparation or otherwise made unfit for use, the word "spoiled" shall be writen plainly on its face, and the form shall be returned to the Accounting Division at Salem (through the Division Office) for credit. Forms used in the preparation of checks will be credited as the checks are received by the Accounting Division at Salem after having been cashed.

c. *Only Original Copies to be Accepted for Payments*—Only the original copy (white copy) of a time statement shall be accepted as authority for payment.

When payment is made on a time statement, the word "Paid" shall be stamped on the face of the time statement with the stamp furnished for that purpose.

d. *Preparation of Time Checks*—Time checks shall be written in ink and shall be signed in ink by the person to whom the check form has been issued and charged. No other person shall sign for him.

No erasures or changes shall be made in the writing on a check. If an error is made, the word "void" should be written or stamped on the face of the check form and the form sent (through the Division Office) to the Accounting Division at Salem for credit.

e. *Time Statement Procedure*—Except as provided in the paragraphs following, the instructions now in effect concerning the issuance

of time statements and time checks are to continue to be in effect under the revised procedure for time reports.

Part-payment: In extenuating circumstances, where it is absolutely necessary that an employee on a traveling crew be provided funds with which to pay for board and/or lodging, such an employee may be permitted to draw a sum in even fives of dollars up to 70 per cent of the gross amount earned by him up to that time, but in no case more than $100.00. In such event, the details as to pay time, and the gross amount earned, are to be shown on the time statement in the usual manner. The amount of the part-payment is to be shown on the "Amount Due" line.

The permission to draw part-payment is being provided strictly as a means of assisting the employee to meet board and/or lodging expense only, and then only if absolutely necessary. Also, permission to draw part-payment is provided for individual and infrequent cases only, and not as a means of creating regular "draw" days. It should seldom be necessary for any but new employees to avail themselves of this privilege.

Abuse of the privilege for drawing part-payment may be sufficient cause for dismissal of the offending employee, or for discontinuance of the part-payment system.

Termination of services: When the services of an employee are terminated and it is necessary to issue a time check in the field in payment of the accumulated time, the procedure for preparing time statements by offices outside of Salem, is as follows:

1. The details as to pay-time earned subsequent to the date of the last time report submitted for the employee is to be shown on the time statement in the usual manner, that is, days or hours worked, rate of pay, and gross amount earned.
2. The total of any part-payments made prior to the date of termination, and the words "Part-Pay't." are to be shown in the "Misc'l." deductions block on the time statement.
3. The net amount of the time statement is to be a sum in even fives of dollars up to 70 per cent of the gross amount earned, less the amount of part-payments.
4. A final time statement is to be prepared showing the details as to pay time earned subsequent to the date of the last time report submitted for the employee, and is to show the total of all part-payment, including the amount computed in step 3 above, in the "Misc'l." deductions block on the time statement. No *net* amount is to be filled in on the final time statement.
5. The two time statements prepared in steps 3 and 4 are to be forwarded together through the regular channels. The office responsible for issuance of the time checks will issue a time check for the amount of the time statement computed in step 3 above, but will not issue a time check for the final time statement prepared in step 4 above.
6. The Accounting Division will complete the final time statement as to time report deductions (hospital dues, group insurance, bonds, withholding tax and retirement contributions) and a time check will be mailed to the employee for the net amount due. For this purpose the final time statement must show the address to which the check is to be mailed.

In the event an employee will wait for the whole of his pay to be mailed from Salem, step 3 above is to be eliminated, and the final time statement is to be sent through the regular channels to the Accounting Division.

Offices in Salem for which time checks are issued by the Accounting Division, are to prepare one time statement in accordance with steps 1, and 2 above, and forward the time statement to the Accounting Division for completion as per step 6, above. The time check will be delivered by the Accounting Division in accordance with the manner indicated on the time statement.

f. *Delivery of Check to Payee*—Time checks signed by a Division Engineer, Assistant Division Engineer, or the Office Engineer in the Division Office, shall be delivered to the payee personally by the Division Engineer, Assistant Division Engineer, or the Office Engineer, or, when delivery in that manner is impractical, shall be sent to the payee by registered mail.

Time checks signed by the persons authorized in the Salem office shall be delivered to the payee personally by the Time Report Supervisor, or shall be sent to the payee by registered mail.

Personal delivery to the payee as above provided may be made either at the office or in the field.

The above specified means of delivering time checks to payees may be deviated from and the check delivered by messenger only when the person by whom the check is signed has personal knowledge of the payee and of the service ren-

dered by him and is personally acquainted with the messenger making the delivery.

When a check is called for by the payee, the person delivering the check shall take up the signature certification slip given the payee by the person by whom the time statement was issued, as hereinbefore provided. The payee shall be required to sign the certification slip in the presence of the paying officer, and the paying officer shall compare the signature so made with the signature made in the presence of the person by whom the time statement was issued. If the signatures are dissimilar in any respect, delivery of the check shall be refused until the identity of the person claiming payment can be positively established. The signature certification slip should be filed with the duplicate copy of the time statement.

In case the State suffers a loss by reason of the delivery of a check by means other than those above authorized, the person by whom the check is issued will be held personally liable.

Article 10—Receipts for Time Checks

a. *Signatures Required*—Whenever a time check is delivered, a receipt, Form A-80, shall be obtained from the payee. The receipt shall be prepared in triplicate on the standard pay check receipt form and shall bear the signatures of both the payee and the person making delivery of the check, and shall be countersigned by a third person who shall be a responsible employee in the office from which the check was issued. The third person will not be required to be a witness to the delivery of the check.

The receipt shall bear the impressed seal of the office or the person by whom the check was issued.

b. *Disposition of Receipt*—The triplicate copy of the receipt shall be held by the person making delivery of the check. The duplicate copy shall be filed with the duplicate copy of the time statement in the office by which the check was issued. The original copy shall be sent (through the Division Office) to the Accounting Division at Salem.

c. *Procedure When Checks are Sent by Mail*—When a check is delivered by registered mail, a registered mail return receipt will be accepted in lieu of the signature of the payee on the standard receipt form. In this case, the receipt form shall be filled out signed by the person responsible for the mailing of the check and countersigned the same as required for personal delivery. The original copy of the receipt shall then be attached to the registered mail return receipt and sent (through the Division Office) to the Accounting Division at Salem.

Article 11—Monthly Statement of Checks Issued

a. *Preparing and Signing of Report*—Each person authorized to issue time checks shall keep a record of all checks issued. The record shall be prepared on form No. A-57, in duplicate.

Each sheet of this record shall be signed by the time report clerk or the office engineer in the division office, the Division Engineer or the Assistant Division Engineer, and the Time Report Supervisor.

b. *Copy to be Sent to Salem*—On the first of each calendar month, the original copy of the report for the previous month shall be sent to the Accounting Division at Salem, where it will be used in checking against the checks turned in for payment.

The report shall be sent in even though no checks have been issued during the month. In such cases, the report should bear the statement "No checks issued during month of ————."

Article 12—Division Office to Keep Time Statement Register

a. *Information to be Shown*—Each Division Office shall maintain a time statment register in which shall be listed the numbers of all time statements furnished by the Salem Office to persons employed within the Division, and in which shall be entered the date, the payee, and the amount of each time statement as it is issued. In this register, there shall be entered, also, the number of the check by which each time statement is paid and the date on which delivery of the check is made.

The time statement register shall be kept on standard form No. A-57.

b. *Purpose*—The purpose of having a time statement register kept in each Division Office, is (1) to enable that office to make sure that all time statements issued in the Division are coming through the office as intended, (2) to afford a check, through the time statement numbering system, on the validity of time statements coming to the office for payment, and (3) to facilitate the checking of time check information re-

quired on the time reports which pass through the office.

c. *Statements to be Checked Promptly as Received*—Each time statement issued at or passing through the Division Office shall be promptly checked against the time statement register to make sure that the number on the time statement is consistent with numbers assigned to and being used by the person with which the statement originated. In case of inconsistency, an immediate check-up shall be undertaken. The numbers of the checks issued in payment of time statements and the dates on which deliveries of the time checks are made shall also be entered in the record, and any cases in which the receipts do not come through promptly, shall be investigated.

Article 13—General Instruction Regarding Time Checks

a. *Conditions Under Which Emergency Payment of Salary or Wages May Be Made*—Payment of salaries and wages by means of time statements and time checks shall be made only under the following conditions:

a. When an employee is leaving the service of the Department or is laid off and refuses to await payment on the regular time report.
b. When an employee is being transferred from one point to another and has not sufficient funds to finance his move.
c. When in the judgment of the superintendent or engineer in charge, an emergency situation is involved which makes immediate payment mandatory.

The issuance of time checks to meet personal obligations knowlingly assumed and anticipated, is prohibited.

b. *Time Paid by Time Check to be Recorded on Time Report*—Persons for whom time statements are issued shall be carried on the regular time report in exactly the same manner and with exactly the same detail as persons not so paid. Amounts paid and cost distribution shall be shown and shall be included in the time report totals. The fact that payment has been made by time check shall be indicated, however, by entering the numbers of the time check in the columns provided on the time report for those numbers.

For time reports originating in offices which do not issue the time checks, the time check numbers shall be placed on the time report when the time report passes through the office by which the checks were issued. The time check numbers shall be placed on time statements in the same manner.

c. *Protection of Statements and Checks*—All checks, time statements, receipts and signature certification slips, and all forms used in the preparation of such documents shall be kept in locked compartments which will afford suitable protection for them. This requirement is not to be construed, however, as prohibiting the carrying of such documents into the field to facilitate prompt payment of persons entitled to such payment.

d. *Signatures*—There shall be no omission of required signatures from any of the forms used in the making of emergency payments. Paying officers shall refuse to make payment on or to otherwise accept any forms from which any required signature is omitted.

No person shall sign for another or permit the signing of one person for another.

e. *Issuance of Checks in Absence of Maintenance Superintendent*—In cases of special emergency, when the Maintenance Superintendent, by reason of sickness or absence from his district, is unable to attend to the issuance of time checks required in the district, the required checks may be issued by the Division Engineer, Assistant Division Engineer, or the Office Engineer in the Division Office and delivered to the payees in the same manner as other checks issued from the Division Office.

The Maintenance Superintendent shall be notified promptly of all such actions and shall be furnished with the duplicate copies of the time statements and with the numbers of the checks issued.

f. *Responsibility for Erroneous Payment*—Persons issuing time statements and checks will be held personally liable for any overpayments or erroneous payments that may result from negligence, carelessness, error or oversight on their part or from their ignorance or non-compliance with any of the instructions given herein.

Article 14—Delivery of Regular Pay Checks

All pay checks and all final time checks shall be issued from the Accounting Division at Salem. The normal means of delivery of these pay checks shall be by registered mail, from the

Accounting Division, addressed to the person in charge of the crew.

At intervals, deliveries to field parties and field crews will be made by traveling auditors, or by such other employees of the Department as the Comptroller may designate.

When the person charged with the responsibility of delivering a check to an individual payee finds it impracticable to personally make the delivery to the payee, he shall arrange for the delivery of the check by another person or by mail, as the circumstances of the case may warrant.

When arrangement is made to have delivery made by another person, this other person shall be required to receipt for the check in his own name and to obtain a receipt from the payee in the manner explained hereinafter under the heading "Acknowledgments of Receipts of Pay Checks".

Should any loss result from the delivery of a check to a person other than the designated payee, such loss shall be made good by the person originally charged with the responsibility of making delivery of the check.

When an employee is transferred from one part of the department organization to another, as, for instance, from one resident engineer to another, the Accounting Division will, upon written instruction from the person under whose supervision the employee has worked, arrange for the delivery of the check by the person into whose jurisdiction the employee has been transferred. In lieu of the above, the person under whose supervision the employee has worked may mail the check to the person into whose jurisdiction the employee has been transferred, requesting that the check be delivered and a receipt obtained and returned.

When an employee who has been laid off desires to call at the Salem Office for a check which is to be issued in his favor, in accordance with a regular time report submitted or to be submitted, the person under whose supervision the employee has worked shall: (1) advise the Accounting Division by letter that the employee will call for his check, and (2) provide the employee with a letter of identification which he shall be required to present to the Accounting Division in order to obtain his check.

Acknowledgments of Receipts of Pay Checks —Persons responsible for the delivery of pay checks shall be responsible also for the obtaining of acknowledgments of receipts from the persons to whom deliveries are made.

The acknowledgments of receipts shall be executed in duplicate on standard form No. A-94, which form makes provision for approximately twenty acknowledgments on a single sheet. The sheets shall be prepared by the Accounting Division.

Each sheet of acknowledgments, after having been signed by the recipients of the checks, shall be signed by the person by whom the checks are delivered. The original copy of each sheet shall then be mailed to the Accounting Division at Salem. The duplicate copy shall be retained by the person by whom the checks are delivered.

When it is found necessary to arrange for the delivery of a check by a person other than the one originally charged with the responsibility of its delivery, the acknowledgment of receipt shall be signed by the person by whom the delivery is to be made, and an explanatory comment shall be entered in the "remarks" column of the sheet. When the person thus entrusted with the delivery of the check makes delivery to the payee, he shall have an acknowledgment of receipt (prepared on a separate sheet of form No. A-94), signed by the payee, and shall send the original copy of the same to the person originally charged with the delivery of the check, who, in turn, shall forward said original copy to the Accounting Division at Salem with (or for attachment to) the sheet of acknowledgments on which the check was first listed.

When it is necessary to deliver a check by mail, the check shall be listed on the sheet of acknowledgments for the crew to which it applies and the person mailing the check shall sign as received of the check and shall write in the remarks column, "Mailed to payee at ——— ———."

Resume - P-61

CREW No. 000-00

DEPARTMENT OR CREW Construction Survey Crew

OREGON STATE HIGHWAY COMMISSION
TIME REPORT

FOR THE MONTH OF May 1950

TO BE LEFT BLANK — PAY ROLL No. ____ SHEET No. ____

TO BE FILLED IN — SHEET No. 1 TOTAL NO OF SHEETS 1

EMPLOYEE No.	NAME	CIVIL SERVICE CLASS NO.	CIVIL SERVICE TITLE / HWY DEPT CLASSIFICATION	JOB PREFIX	FUNCTION No.	SUB. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	INS. DA.	TOTAL DAYS HOURS	RATE	AMOUNT AT RATE	GROSS AMOUNT EARNED	TIME CHECK No.	PAYROLL CHECK No
	John C. Smith		C.E. III	212-1040	900																				X	X	X											3			44 51			
				12-1477	900		X	X	X	X	X	X	X								X	X	X	X				X	X	X							X		16	460 00	237 42			
13826		3013	Res. Engr.	8111	568										X	X	X	X	X	X											X	X	X	X	X	X		19	12		178 07	460 00		
	Robert W. Cain		E.A. I	12-1477	900		X	X	X	X (Off acct of injury.)																												9	200 00	58 07			
										1st step increase due May 17 →											X	X	Ex	Ex	Ex			X						X	X	X	15	9	209 00	60 68			
80000		3001	Chainman	8111	568																							X	X	X			X	X	X			6		40 45	159 20		
	Donald R Johnson		E.A. I	212-1040	900																				X	X	X											3		19 36			
				12-1477	900																							X	X	X	X	X	X	X	(Sick)		7	200 00	45 16			
33641		3001	Chainman																																		10				64 52		
	Albert C. Abel		E.A. II	12-1477	900		X	X	X	X	X	X	X															X	X	X	X	X	X	X	X	X		17	320 00	164 52			
														← Military Leave of Absence →																							17	14		139 48			
31226		3002	Computor																																						300 00		
	George L. Brown		C.E. I	12-1477	900		X	X	← Jury Duty →		X	X	X	X	X	X	X	X	Terminated																			13	350 00	146 78			
36266		3011	Draftsman	✓	✓	✓	Terminal Exchange Time Leave 36 hours																															10			-15 00			
				8011	568		Terminal Vacation Leave 12 days																																	36	2 19	78 84			
																																								12	14 00	168 00		F38025	
																																										378 62		

EXPLANATION OF UNUSUAL CASES AS SHOWN ABOVE:

Donald R. Johnson is a new man and has no Sick Leave credit until 15 days have been worked. No vacation until 15 days have been worked. He cannot be paid for the holiday (May 30) until he has returned to work. If the period of an approved leave of absence without pay is 7 calender days or less the employee (on a monthly rate) is entitled to pay for holidays and Sundays falling within the leave. In this case payment can be included with the next months Time Report if he complies with the above rule.

Albert C. Abel - Military Leave with pay is allowable if the employee has worked 6 months or one full paying season and can support the pay roll with a copy of an order for such training signed by a commanding officer.

Robert W. Cain - Injury sustained while on the job. All time lost in such cases will be shown on a separate Time Report and labeled "Time lost due to Injury". Extend this out as far as, but not including "Gross Amount Earned" column. This Time Report should be accompanied by a separate Statement of Absent Time marked "Time lost due to Injury". If this employee has Sick Leave credit an adjustment of salary will be made charging his Sick Leave credit with 1/2 day per work-day and deducting the payment made by the Accident Commission during the period of sick leave eligibility.

PREPARED BY: George L. Brown

CERTIFIED AS CORRECT AND AS A PROPER CHARGE AGAINST THE STATE OF OREGON: John C. Smith PERSON IN CHARGE

INSTRUCTIONS—SUBMIT ORIGINAL TO THE ACCOUNTING DIVISION.

CHECKED: POSTED:

TOTAL OF THIS SHEET 1362 34

CREW TOTAL (ENTER ON LAST SHEET ONLY)

FORM A 348

SUMMARY OF COST DISTRIBUTION

JOB PREFIX	FUNCTION No.	SUB. No.	GROSS AMOUNTS EARNED	VAC AND E. L. PERCENTAGE CHG. RATE 5.2%	TOTAL CHARGE TO JOB	ACC. INS. CLASS. * CLASS.	SYM.
212-1040	900		63 87	3 32	67 19		1
12-1477	900		911 95	47 42	959 37		1
8011	568		168 00	—	168 00		
8111	568		218 52	—	218 52		
GROSS PAY ROLL			1362 34	50 74	1413 08		

P-61 Redraw

OREGON STATE HIGHWAY COMMISSION
SALEM, OREGON

TIME REPORT

MONTH OF May 1950

JOB Long Creek - Morrow Co. Line
(GIVE ONLY THE PRINCIPAL JOB IF THERE ARE MORE THAN ONE)

JOB PREFIX 12-1477 NO. OF SHEETS 1

IN CASE OF EXTRA GANG TIME REPORT, DISTRICT MAINTENANCE SUPERINTENDENT IS TO SIGN HERE

APPROVED _____ DISTRICT MAINTENANCE SUPERINTENDENT

APPROVED _____ STAFF ENGINEER—DIVISION ENGINEER

CHECKS TO BE DELIVERED OR SENT TO.

J. C. Smith NAME

Long Creek, Ore. ADDRESS

CERTIFICATE AS TO ABSENT TIME

(1) I hereby certify that **NO** absent time is included as pay time on this time report.

Signature: .....

Title: .....

(2) I hereby certify that no absent time is included as pay time on this time report other than that shown on the statement of absent time, covering the same period as this time report, which I am submitting herewith or will submit at the end of said period; and that the absent time included as pay time on this time report is not in excess of accumulated absent time credits of the respective employees.

Signature: John C. Smith

Title: Res. Engr.

CHANGES IN PLEDGED DEDUCTIONS

EMPLOYEE No.	NAME OF EMPLOYEE	M H A	O P E	BONDS	OTHER ITEM	AMOUNT

CANCELLATION OF REDUCTIONS

STATEMENT OF TIME CHECKS ISSUED

EMPLOYEE No.	GROSS AMOUNT EARNED	DEDUCTIONS: ACC. INS.	M H A	O P E	BONDS	TAX	U.S. DEF. BD.	RETIREMENT CONTR. AMOUNT	RETIREMENT CONTR. PER CENT	OTHER	NET PAY	TIME CHECK No.

Form A 69—332
STATE PRINTING

Pay Roll No. .....
Sheet No. .....

OREGON STATE HIGHWAY COMMISSION

STATEMENT OF ABSENT TIME

Covering pay roll of Construction Survey Crew
(Kind of crew or name of sub-department)

Under supervision of John C. Smith Period May, 1950

NAME (List only employees having absences to be reported)	PERIOD OF ABSENCE (Inclusive dates) From	To	✓	Total Time Absent Days	Hrs	TIME ABSENT WITH PAY: Non-work Days	Sick Leave (Days)	Vacation Leave (Days)	Exchange Time Leave (Hrs.)	Training Camp (Days)	Jury or Witness Duty (Days)	Days Absent Without Pay
If absent time is included as pay time on the pay roll be sure to sign absent time certificate (2), on pay roll												
John C. Smith	5-9	5-14		6		1	5					
" "	5-25	5-30		6		3	3					
Robert W. Cain	5-19	5-21			24	2 da.			8			
" "	5-22	5-24		3			3					
" "	5-26	5-28		3		2	1					
Albert C. Abel	5-8	5-21		14		2				12		
George L. Brown	5-3	5-5		3							3	
" "	Terminal	Ex. Time			36				36			
" "	Terminal	Vac.		12				12				

NOTE: Do not use this form if there were no absences; sign absent time certificate (1) on pay roll.

I hereby certify that to the best of my knowledge and belief the above statement is a true and complete statement of all absent time (other than regularly allowed absent time on Saturday afternoons, Sundays and holidays) included as pay time on the pay roll which this statement is represented to cover.

Noted: (signed) B. B. Black (Immediate Superior) Signed: (signed) John C. Smith

Title: Division Engineer Title: Resident Engineer

This space for use of Pay Roll Office

Compared with pay roll:

Entered on record of absent time:

INSTRUCTIONS This statement is required in connection with all pay rolls that include absent time or leave time at pay time. Send one copy to the Accounting Division. Periods of absence shall be understood to be from the beginning of the first day to the close of the last day of the "period of absence" unless otherwise indicated. Non-work days include Sundays and holidays and other time, if any, such as Saturday afternoon, which is not regular work time under the pay roll concerned. Non-work days are to be listed in this statement only when they occur in conjunction with absences of other kinds. Exchange time leave is to be reported in hours only, all other absences are to be reported in days only. When leaves are shown for jury or witness duty, for training camp attendance or for "extra vacation" time, this statement must be accompanied by letters of explanation, as explained in circular letters applicable thereto.

Form A 94—625—5-45

OREGON STATE HIGHWAY COMMISSION

Pay roll month June, 1945
Voucher No 48521

ACKNOWLEDGMENT OF RECEIPT OF PAY CHECK

Each of the undersigned hereby acknowledges receipt of the pay check of the serial number opposite which his signature appears:

Name of Payee	Serial No. of Check	Date Delivered	Signature of Person Receiving Check	Remarks
John M. Smith	1231	7/5/45	John M. Smith	
George W. Brown	1232	7/5/45	George W. Brown	
James L. Doe	1233	7/5/45	James L. Doe	Mailed to payee at Cottage Grove
William O. Jones	1234	7/5/45	William O. Jones	

I hereby certify that the above listed pay checks were delivered by me as above indicated.

John M. Smith (Name)

July 5, 1945 (Date) Resident Engineer (Title)

Checks are expected to be delivered to the payees personally. When delivery is made to any other person, or by mail, that fact shall be indicated and the occasion for it fully explained

STATE PRINTING

This Space for Use of Accounting Division
Voucher No.
Compared with check register by

Form A-330—62f—10-43
STATE PRINTING

OREGON STATE HIGHWAY COMMISSION

REPORT OF EXCHANGE TIME WORKED

Supporting Pay Roll of: Engineering Crew — Construction Department
(Kind of crew or name of sub-department) Pay Roll No. ....

Under Supervision of: John M. Smith, Resident Engineer Period June, 1945

Name / CLASSIFICATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Hours Worked	Reason for Exchange Time Worked
George W. Brown Computor																						8										8	Contractor installed large culvert on 22nd (election day), necessary to have inspector present.

I hereby certify that, to the best of my knowledge and belief all of the time reported hereon is time worked outside of regular working hours and is time eligible for exchange time leave in accordance with the Department's rules and regulations relating to exchange time.

Signed: (signed) J. M. Smith Noted: (s) B. B. Black (Immediate superior)

Title: Resident Engineer Title: Division Engineer

This Space for Use of Pay Roll Office

Compared with pay roll:

Entered or record of absent time:

INSTRUCTIONS: This report is to be prepared only when exchange time worked amounts to one hour or more in any one day, and then only in the event that exchange time leave is not taken on the same day.

Submit original with pay roll to the Accounting Division. Prepare and submit copies in accordance with instructions contained in circular letters relating thereto.

Form A-80—6M Sets—3-46 Original

OREGON STATE HIGHWAY COMMISSION

Acknowledgment of Receipt of Time Check

Check in favor of George L. Brown Check No. F38025

In the amount of $100.00 Time Statement No. 14910 (If any)

I hereby certify that I did personally receive the check above described on May 13, 1950

George L. Brown
(Signature of person receiving check)

I hereby certify that I did personally (Personally or by registered mail) deliver the check, above referred to, to the person for whom it was intended, on May 13, 1950

A.M. Wells
(Signature of person delivering check)

Title Off. Eng.

Countersigned John Doe
(State Supt. or Div. Engr.)

SEAL OF ISSUING OFFICE

If delivered by mail, attach return registered mail receipt to original copy hereof and forward to Salem Office. Show number of registered mail receipt and name of issuing post office here:

No. ..... P. O. .....

STATE PRINTING

Form No. A-319—5M—12-43

OREGON STATE HIGHWAY COMMISSION

Physician's Certificate

June 12, 19 45

I, M. A. Doctor, M. D., a physician in active practice at Pendelton, Oregon, do hereby certify that John Doe has been sick or injured, and that said sickness or injury has necessitated his or her absence from his or her employment during the period from June 2, 1945 to June 11, 1945, inclusive.

(signed) M.A. Doctor, M. D.
Attending Physician

Sick leave allowance in excess of three days may be granted only when the pay roll is accompanied by a copy of this form duly executed by a practicing physician. When the leave overlaps two or more pay roll periods, each of the pay rolls involved must be accompanied by a certificate.

STATE PRINTING

Form No. 507—6M—1-38

OREGON STATE HIGHWAY COMMISSION

Signature Certification

To Mr. B. B. Black
Division Engineer
Bend, Oregon

Redmond, Oregon
June 17, 1945

The signature appearing in the lower left-hand corner hereof was made in my presence by John Doe, who is entitled to payment for services rendered in the capacity of Chainman during the month ending June 30, 1945, as indicated by { Time statement Number 10436 / Regular pay roll closed June 30, 1945

(s) John Doe
(Signature of above-mentioned person, made in presence of employe issuing this certificate)

(s) John M. Smith
Resident Engineer
(Title)

(Signature of above-mentioned person, made in presence of employe delivering check)

SEAL OF ISSUING OFFICE
SEAL

This certificate is issued to assist in the identification of persons entitled to receive payment for service rendered the State Highway Commission, who may call in person for such payment at the proper paying office.

STATE PRINTING

Form A-193 6M Sets—3-46 Original

OREGON STATE HIGHWAY COMMISSION

Time Statement

(Non-Negotiable)

Date May 13, 1950

No. 14910

Service rendered by George L. Brown During month of May 1950

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Time	X	X	X Jury Duty	X	X	X	X	X	X	X	X	X	X																		

Employed as Draftsman from 5/1 to 5/13 13 days at $ 350.00 5¢ per day Earned, $ 146.78
Jury Duty 5/3 to 5/5 3 — 15.00
Terminal Exchange Time 34 hours at $ 2.19 Earned, $ 74.46
Employed as " Vacation from to 12 days at $ 14.00 Earned, $ 168.00

DEDUCTIONS

Acc. Ins.	Hosp. Dues	Group Ins.	Federal Tax	Code	Pension	%	Misc'l.

Total Amount Earned, $ 378.42

Total Deductions, $

Amount due One Hundred dollars and no/100 cents, $ 100.00

Signed by: George L. Brown (Payee)

Signed by: George Brown (Timekeeper or Office Man)

Signed by: (Crew Supt., Foreman or Engineer)

Signed by: J. C. Smith (Maint. Supt. or Div. Engr.)

Name of Crew Foreman or Engineer

Kind of Crew

Paid by Check No.

Name of Person Signing Check

Reserve Space—Salem Office

Voucher No.

Checked as to form

Regular pay roll

Record of checks

Duplicate time statement book

SECTION 3. SICKNESS AND BENEFITS

Article

1. Hospital Association Agreements.
2. Hospital Association Membership and Application.
3. Doctors Available Under Hospital Agreements.
4. Transfer of Employees.
5. Hospital Association Benefits not for Injury During Work.
6. Industrial Accident Deductions.
7. Industrial Accident Compensation.
8. Group Insurance.
9. Inoculations Against Rocky Mountain Spotted Fever.
10. First Aid Supplies.

Article 1—Hospital Association Agreements

The Oregon State Highway Commission has entered into agreements with the following hospital associations:

Oregon Physicians Service
1214 S. W. 6th Ave. (Phone CApital 3251)
Portland 4, Oregon
455 Ferry Street (Phone 3-9187)
Salem, Oregon
225 Medford Building
Medford, Oregon

National Hospital Association
732 S. W. 3rd Ave. (Phone ATwater 5291)
Portland 4, Oregon

Article 2—Hospital Association Membership and Application

Any employee may apply for membership in either of these associations, but membership is not compulsory. Application forms are provided by the Accounting Division. Department heads or resident engineers are not to solicit memberships.

Article 3—Doctors Available Under Agreements

Information can be obtained locally as to the doctors available under the various hospital agreements. A satisfactory list cannot be prepared as changes are being continually made.

Article 4—Transfer of Employees

When an employee is transferred the engineer or department head shall inform the engineer or department head to whose supervision he is being transferred, as to whether or not the employee is a member of a hospital association, by indicating such information on the Personnel Action form CS 124. See Sec. 4, Art. 6).

Article 5—Hospital Association Benefits Not for Injury During Work

The agreement with hospital associations does not apply to or cover injuries sustained by an employee arising out of and in the course his employment with the State Highway Commission. In case of such injuries, the employee must look to the State Industrial Accident Commission.

Article 6—Industrial Accident Deductions

Industrial accident deductions of $0.01 per day will be deducted on the time report in addition to the deductions for hospital association membership fees.

Article 7—Industrial Accident Compensation

It shall be a responsibility of all supervisory employees to see that all injuries to employees working under their supervision are promptly and properly reported in accordance with these instructions.

Each injury requiring the attention of a doctor shall be reported both to the State Accident Commission and the Highway Accounting Division on Accident Commission Report Form No. 20, a supply of which form should be requisitioned in the regular manner and kept on hand in all field offices.

In the case of even trivial injury, and particularly if there is to be a loss of work time, the employee should be encouraged to see a doctor and have a report made on Form 20 for two reasons, (a) the case may develop complications and (b) compensation for lost time cannot be collected from the Accident Commission unless the case is attended by a doctor and a report made on Form 20.

If the injury is of a serious nature, it should be reported immediately to the Division Engineer and the Staff engineer by *letter or telephone* as the seriousness of the injury may indicate; report on Form 20 to follow later.

In each case where claim for lost working time is to be made against the Accident Commission, the employee is to be dropped from the regular time report and carried on a special time report, as provided for in the regulations applicable to "sick leave," Section 2, Article 6.

Reporting of Injuries on Form 20 is to be handled as follows:

a. The report is to be prepared *in duplicate* with additional copies for the supervisory

employee and others, if desired; the workman's portion being filled out and signed by the injured workman, and the employer's portion being filled out and signed by the supervisory employee.

b. The original and duplicate copies of the report, filled out and signed as above indicated, shall be presented to the doctor by the supervisory employee or his assistant with the request that the doctor complete the report and forward the original copy thereof to the State Industrial Accident Commission as the Accident Commission regulations require.

c. Arrangement should be made with the doctor whereby the duplicate copy of the report will be called for by the supervisory employee or his assistant within a reasonable length of time. The doctor should, in all reason, be allowed at least three days in which to fill out his portion of the report.

d. When the duplicate copy of the report is obtained from the doctor, it is to be forwarded immediately to the Highway Accounting Division.

In the interest of the injured person, as well as the interest of the Department, the supervisory employee is urged to see that the above specified procedure is carried out expeditiously.

Article 8—Group Insurance

Group life insurance is available to all monthly rate employees.

The group insurance referred to herein is furnished by the California Western States Life Insurance Company of Sacramento, California.

The amount of insurance for which an employee may apply is fixed at $1,000.00. It can neither be greater nor less than $1,000.00.

New employees entering the service of the Department who apply for the insurance within 60 days after entering the service, will be accepted for insurance regardless of physical condition and without medical examination.

Employees who do not apply for the insurance within the time limits as stated above, may, if the insurance company so orders, be required to furnish, at their own expense, evidence of insurability satisfactory to the company.

Deductions will be shown on the time report for the full amount of the monthly premium for each month or fractional month that the employee is carried on the Highway Department time report.

Questions concerning the operation of group life insurance should be addressed to the Accounting Division at Salem.

Article 9—Inoculations Against Rocky Mountain Spotted Fever

The Highway Department is desirous of having inoculations against Rocky Mountain Fever taken by all field employees whose work is located in any of the areas of the State which are or may be infested.

It is therefore suggested that all employees, whose work is likely to take them into such areas, secure the necessary shots.

Both the National Hospital Association and the Oregon Physicians' Service are under contract with this Department to bear the expense of such inoculation. Those of our employees who carry coverage in either of the above associations may, therefore, proceed in the usual manner, having the doctor to whom they report bill the appropriate hospital association for the entire expense of the three inoculations at the standard price of $1.00 per shot.

Those of our employees who do not carry coverage in either of the above hospital associations will obviously have to bear the expense of these inoculations in the first instance. However, the State Industrial Accident Commission has agreed to contribute $ .50 per shot to the cost of these inoculations and if these employees (those who are not covered by either hospital association) will forward to the headquarters office in Salem, through the regular channels, a receipt from their doctor covering the cost of these inoculations, the Salem office will in turn forward it to the Accident Commission for reimbursement in the amount of $ .50 per shot, as above noted.

It sometimes, though very rarely, happens that one or more of these inoculations is followed by an unfavorable reaction. In the event of such unfavorable reaction, if medical treatment is required, the Industrial Accident Commission will assume the expense and it will be proper for the workman to file a claim.

It is urged that all employees in infested areas take advantage of these offers and secure the necessary inoculations.

Article 10—First Aid Supplies

. The First Aid supplies listed below will be furnished on presentation of a Storeroom Requi-

sition, (Form A-33) to the Salem Shops. The supplies as listed below are the only first aid supplies that will be furnished. Other supplies such as aspirin, ST37, Absorbine Jr., etc., will not be furnished.

The stock supplies are as follows:

1. First Aid Kits, 10 unit size.
2. Adhesive Compress, 1"x3½", 16 per pkg.
3. Adhesive Tape, ½"x2½Yd., 1 per pkg.
4. Ammonia Inhalant, 10 per pkg.
5. Methiolate, 3 per pkg.
6. Bandage Compress, 2 per pkg.
7. Foille Ointment, 6 tubes per pkg.
8. Eye Dressing, 1 per pkg.
9. Poison Ivy Ointment, 6 per pkg.
10. Tourniquet and Forceps, 1 per pkg.

In ordering these supplies list only one item on each line.

INDUSTRIAL ACCIDENT COMMISSION
SALEM, OREGON

ACCIDENT CLAIM

— RECEIPT STAMP —

— FOR COMMISSION USE ONLY —

HAZ.	Notice filed	CLAIM No
NON-HAZ.	Election filed	FIRM No.
DEFAULT		CLASS CODE
REJECTION		
EMPLOYER OCC		
WORKMAN FIRST EMP		

ALL QUESTIONS MUST BE ANSWERED
Part I Workman's Application for Compensation

1. Name (Please Print) ..... (First Name) (Middle) (Last)
2. Address ..... (Street) (City) **Social Security No.**
3. Age ..... Sex ..... If married, full name of wife or husband .....
4. Address, wife or husband ..... (Write "Same", if living together) If divorced, date .....
5. **Name of employer** ..... **Address** ..... **Are you related** .....
6. Were you doing your regular work at time of accident? ..... On employer's premises? .....
7. Piece or time work? ..... Wage or earnings per day $ ..... Name days off each week .....
8. Working shift from ..... A.M. P.M. to ..... A.M. P.M. Hours per day ..... Kind of work .....
9. **Date of accident** ..... (Month) (Day) (Year), 19..... Hour of day? ..... A.M. P.M. How long in present employ? .....
10. Place where accident occurred: ..... (Street No. or distance or direction from nearest post office) City ..... County .....
11. **Will you lose time from work?** ..... **If so, date you quit** ....., 19 ..... **Hour** ..... A.M. P.M.
12. **Can you work now?** ..... **If so, date you returned to work** ....., 19 ..... **Hour** ..... A.M. P.M.
13. Describe how accident happened and GIVE CAUSE .....
14. Names of witnesses to accident .....
15. Part of body injured ..... Right ☐ Left ☐
16. Has this part been injured before? ..... Approximately when? .....
17. Have you ever filed a claim with the Commission? ..... When? .....

GIVE NAMES AND BIRTH DATES OF YOUR CHILDREN UNDER 18 SUPPORTED BY YOU

NAME	RELATIONSHIP	DATE OF BIRTH Mo. Day Year	NAME	RELATIONSHIP	DATE OF BIRTH Mo. Day Year
18.					
19.					
20.					

I declare that the foregoing statements are true to the best of my knowledge and belief.

Signed ..... day of ....., 19...., at ....., Oregon, ...

IMPORTANT **WORKMAN SIGN HERE** .....

ALL QUESTIONS MUST BE ANSWERED
Part II Employer's Report

21. Was this workman engaged in the regular course of employment when injured? ..... (Yes) (No)
22. Date and time of accident ..... (Date) (Hour) A.M. P.M. Date reported ..... To whom reported .....
23. Cause and nature of accident and injury .....
24. Have all earnings of this claimant been included in the payrolls reported to this Commission? ..... (Yes) (No)
    If answer is "no", explain fully .....
25. Under what payroll classification have you contributed on this claimant's wages ..... (Division of payroll) (Logging—sawmill—construction—etc.)
26. Is claimant employed 5 ☐ 6 ☐ 7 ☐ days a week. What is claimant's average daily earnings? .....
27. If injury results in time loss, will you pay claimant any wage while disabled? .....
28. Have you reason to question the validity of this claim? ..... (Yes) (No) If answer is "Yes", explain fully to the Commission. .....
29. **IF** Corporation—State whether or not claimant is an officer or director of the corporation .....
    Partnership—Is claimant related to any partner? ..... Does he reside with him? ..... Relationship? .....
    Individual—Is claimant related to employer? ..... Does he reside with him? ..... Relationship? .....
30. **FIRM NAME OF EMPLOYER** ..... Address .....
31. **SIGNED BY** ..... (Title) Kind of business .....
32. Signed at ....., Oregon, this ..... day of ....., 19.....

ALL QUESTIONS MUST BE ANSWERED
Part III Physician's Report

33. Complete description of symptoms, objective findings, complaints, parts injured, (record minor injuries and complaints). Use reverse side if necessary .....
34. Date of first treatment ..... Hour of first treatment ..... To what hospital sent .....
35. Treatment used .....
36. X-rays or other diagnostic measures and findings (describe fully on reverse side) .....
37. Is injury serious enough to prevent working? ..... Estimate of time loss as a result of this injury .....
38. Is present disability due entirely to this injury? ..... If not, state contributing factors on reverse side .....
39. Will this injury result in permanent disability? .....
40. Has patient been maimed or crippled by previous injury? ..... If so, describe on reverse side .....
41. Does previous injury involve this particular part of the body? ..... If yes, specify on reverse side .....
42. Are you treating this case for a hospital association? ..... As a contract physician? .....
43. Is the condition requiring treatment medically related to the injury as described to you? .....
44. Employer's business name ..... Signed ..... (If not an M.D., affix professional degree)
45. Patient's name .... (Also print or type name here ▲)

Form No. 20 (Rev.) 9-1-48 Address ..... Date .....

(DOCTOR'S REPORT CONTINUED)

Complete description of X-ray findings must be given below (rule 48 X-ray schedule):

.....

All other information of importance not adequately covered in answer to questions on reverse side should be fully detailed here:

.....

INSTRUCTIONS TO WORKMEN

Workmen are required to report accidents to the employer, who will furnish this form and assist in completing it. After the employer's section of the report has been completed, the workman should take the form to the attending physician who will complete the balance of the form and mail it to the Commission.

INSTRUCTIONS TO EMPLOYERS

Employers are required to keep a supply of these forms on hand and assist workmen in completing them upon request. If you have any reason to oppose the allowance of this claim, please complete the employer's section and state your reasons why the claim should not be allowed.

Employers should read carefully all information given in workman's report. Names of witnesses to the accident are important and should not be overlooked.

INSTRUCTIONS TO ATTENDING PHYSICIANS

A workman reporting for treatment should have this form completed by himself and employer, in order to insure payment for medical attention. Workmen who are employed by employers operating under a medical or hospital contract are not entitled to treatment except by contract doctors.

The report when completed should be mailed to the State Industrial Accident Commission, Salem, Oregon.

SECTION 4. PERSONNEL

1. Basic Personnel Regulations.
2. Elements of Good Supervision.
3. Basic Personnel Forms.
4. Position Classification.
5. Salary Changes.
6. Appointments.
7. Promotion, Transfer, and Demotion.
8. Merit Ratings.
9. Termination.
10. Leaves of Absence.
11. Disciplinary Actions.
12. Retirement.
13. Bonded Employees.

Article 1—Basic Personnel Regulations

The State Civil Service Commission rules and regulations and the State Retirement Law form the basic personnel policy under which the department operates. All supervisors have copies of these regulations; those who do not may obtain them upon request to the Personnel Division.

Within the framework of this basic policy, the department has issued supplements, amendments, and other clarifying directives to facilitate personnel matters.

The department's general personnel policy is simple and it is believed effective: namely, the responsibility and moral obligation of serving employees frankly, fairly, and according to the merit principle in all employment problems and situations; while fulfilling the department's obligations of loyalty and service to the public.

Employees are urged to discuss specific personnel problems with their immediate supervisor. Either a personal call or a request for information by letter to the Personnel Division will always receive prompt and courteous attention.

The following articles will describe in a summary form the basic personnel methods, provisions, and techniques. It is designed to serve only as a guide or outline of the department's personnel administration. Detailed explanations of methods should be obtained from either the Retirement Law and the Circular Letters pertaining thereto; or from the Personnel Rules which are revised from time to time as needed.

Article 2—Elements of Good Supervision

The real value of personnel management is measured at the immediate supervisory level. In a sense every supervisor is a personnel manager so far as his employees are concerned; and the total effectiveness of the personnel program for the entire department is the sum of the activities of all supervisors.

It is not enough for a supervisor to be technically competent and to understand *what* his responsibilities and authority are. He must also understand *how* to discharge his responsibilities and exercise his authority.

Supervisory and managerial methods tell him *how* to get his job done. They are the tools he uses as a supervisor and are fully as important as the transit, level, drafting instruments, and other engineering tools. The supervisor's effectiveness is in direct proportion to his understanding and use of these approved methods. Increasing the individual supervisor's understanding of and ability to use these methods will increase the overall effectiveness of the department's operation.

Though the methods are simple and well known to everyone, you will note that they are always characteristic of a good supervisor. They have been tested by time as the successful means of directing people in their work. Some typical supervisory and managerial techniques are listed below. These are applicable to all supervisors at all levels.

1. Dealing with employees as individual human beings.
2. As much as possible knowing each employee personally.
3. Encouraging and accepting the suggestions of employees.
4. Giving clear-cut instructions; praise, and constructive criticism.
5. Keeping employees fully informed of things they should know.
6. Getting employees to have a genuine feeling of belonging to the department.
7. Causing employees to understand that they are performing useful, important work.
8. Avoiding any acts of actual or seeming partiality or special treatment toward individual employees.
9. Being certain that each employee knows exactly what his job is.
10. Directing employees with a minimum use of orders and display of authority.
11. Listening to employee's troubles and complaints and properly settling them whenever possible.
12. Letting employees know how they are getting along and giving them all deserved credit.
13. Training and helping employees to improve and develop.

Article 3—Basic Personnel Forms

Personnel Forms have been developed on the principle of a minimum of forms to accomplish a multiplicity of purpose. Forms CS-100 (Fig. 1) is the Employment Application sheet used by the individual applying for a position, or seeking promotion. CS-124 (Fig. 2) is an "omnibus form" covering all possible types of personnel actions including "Request for Certification" (requisition for personnel). The "Personnel Merit Rating" is used to rate the efficiency of all employees.

Article 4—Position Classification

With certain minor exceptions, all positions in the department are "classified" according to similarities of duties and responsibilities—based on the type of assignments handled over a period of time. The classification plan is a job inventory which puts all positions which are sufficiently alike in terms of responsibility and qualifications under the same titles.

If there is a question about the classification of a position, the supervisor should submit a Personnel Action form (checking the box "Reclassification of Existing Position"), and accompany it with a Classification Questionnaire describing the duties (these forms are obtainable upon request from the Personnel Division). Likewise, in establishing a new position a Classification Questionnaire should be completed by the immediate supervisor describing the contemplated duties.

Article 5—Salary Changes

The department operates under a standarized salary plan consisting of a range of six steps for each class. All trades, craft, and laboring classifications in the Maintenance Division are on a three step salary range.

No salary increase is automatic and advancement above the second step will be granted only when merited and authorized by the State Highway Engineer.

a. *Six months' Increase*—New employees start at the minimum of the salary range and are eligible for advancement to the second step after six months' satisfactory service. The employe must receive a rating of "Good" or higher on the Trial Service rating form before receiving this increase. The Personnel Division notifies the supervisor well in advance of the eligible date of the employee.

b. *Annual Increases*—Annual merit increases are permitted for those with a sufficiently high merit rating after one year of service from the date of the last increase. The Personnel Division also notifies the supervisor by form letter well in advance of the eligibility date for the employee.

c. *Overtime*—Employees in higher supervisory positions are not eligible for overtime. Employees on a six step salary range earn overtime at the rate of time and one-half for work in excess of an eight-hour day or forty hours a week. Such overtime is accrued on an exchange time basis.

It is an important responsibility of the supervisor to be certain that his employees take their exchange time within one year of the month in which they earned it. Otherwise this time is lost to the employee.

Article 6—Appointments

At the present time positions in most all categories must be filled from lists established through examination by the Civil Service Department.

a. *Examinations*—Tests usually consist of one or more of the following: Written tests, performance tests, interview examination, evaluation of experience and training, and evaluation of the merit or efficiency rating. Candidates are placed on the appropriate list according to the rank order of their scores.

b. *Lists*—Lists are established on a priority basis. The *re-employment list* has priority over all other lists for a given classification. Anyone whose work is satisfactory and who is *laid off* due to a reduction in force has his name placed on this automatically, if the Personnel Action form was so checked. Any regular employee who resigns in good standing may have his name returned to this list by his own request, if this is done within two years of the resignation. Names are placed on the re-employment list in rank order.

The *promotion list* for a given class consists only of Highway Department employees in the rank order of scores. This list has second priority.

The *open competitive list* consists of employees outside the State service in the rank order of score. This list is used only when there

are no qualified candidates on the two previously mentioned lists.

c. *Applications for Examinations*—To file for an examination where an emergency or provisional appointment is made, two copies of the Employment Application (CS-100) must be filled out by the candidate and forwarded to the Highway Personnel Division. In other cases only one copy need be filed.

d. *Requisitions for Personnel*—When a vacancy occurs in a classification covered by examination, a "Request for Certification" should be originated by an immediate supervisor, Division Engineer, Department Head, or Staff Engineer. If it originates with an immediate supervisor, it should be sent through regular channels for proper signatures. If there is urgency in filling a position, the formal request may be preceded by telephone or radio. Approximately two weeks time should be allowed to fill a request from the field.

On the request under "Remarks" special qualifications should be designated, e.g., draftsman, computer, transitman. In this manner, "Selective Certification" can be requested and only those eligibles possessing the special qualifications will be certified.

Upon receipt of a request the Personnel Division immediately requests certification from the Civil Service Department to fill the vacancy. The appropriate top three names from the list comprise a "certification." The records of these three eligible applicants are reviewed with the proper Staff Engineer, or his representative, and the supervisor, if convenient. If interviews are advisable, these are accomplished. The one eligible chosen is instructed to report directly to the supervisor concerned. An eligible has five days from the time of notification to either accept or reject a position offered.

Lists are established for each class by acceptable geographic areas specified by the eligible. Certification for a vacancy in Madras, for example, would be made from those eligible willing to go there.

e. *Other Appointments*—"Provisional" appointments may be made by the supervisor concerned if there are not at least three names on the appropriate eligible list. In no case should a provisional apointment be made until notice has been received from the Personnel Division that there are not eligibles available from the list. A provisional appointment applies only to the request for which it was given and should be considered void if not made within one month.

An "Emergency" appointment can be made without reference to any existing list. Cause for emergency appointment shall be conditions which without the immediate employment of an individual would result in stoppage of work, inconvenience to the public or loss of life or property. Such appointments can be made without prior approval for the duration of the emergency, but not to exceed *two months.* The "Report of Emergency Appointment" box should be checked on the appointing Personnel Action form. The status would be "Emergency."

f. *Labor Permits*—State Bureau of Work Permits for minors, age 16 to 18, must be procured for appointment of anyone in this age group. The following procedure is in force.

1. No Personnel Action form appointing an individual under 18 years of age will be approved unless accompanied by a Bureau of Labor Work Permit. The permits will be retained with the individual's record in the Personnel Division until the termination Personnel Action form is received. At that time the Personnel Division will return the Permit to the Bureau of Labor according to the regulations of that department. Permits, also, are returned to the Bureau of Labor when the minor reaches the age of 18 years.
2. On the blue "Minor's Application for Permit" form used in applying for permit, at the bottom of the section to be filled in by the prospective employer, the following notation should be made: "Please send permit to ————————" indicating the name and address of the field supervisor first making up the Personnel Action form. Otherwise the completed permit is sent to the main office of the Highway Department and delays result in relaying it to the employer. Proof of age should be furnished to the Bureau of Labor as soon as possible to avoid delay in obtaining the Permit.
3. Even though a minor has worked under a Work Permit a previous year, another Permit is required the following year. However, once the Proof of Age has been furnished to the Bureau of Labor for the first Permit, it is not necessary to furnish this proof again upon subsequent application for Work Permit.

Article 7—Promotion, Transfer, and Demotion

a. *Promotion*—Promotion is effected in the same manner as filling any other vacancy—that

is by making a "Request for Certification" on the Personnel Action form. If a promotional list exists, then the top three qualified individuals are certified and a choice is made of one. A salary increase always accompanies a promotion from one classification to a higher classification.

b. *Transfers*—A transfer of an employee in the same classification is effected by agreement of the two supervisors concerned, and is usually arranged by the Personnel Division. On transfers within the Highway Department, copies one to six inclusive of the Personnel Action form should be sent to the supervisor to whom the employee is being transferred, and then to the Accounting Division. Transfers to or from other State departments should be cleared through the Personnel Division beforehand. On all transfers, pertinent information, such as retirement number, accrued vacation and sick leave, exchange time, etc., should be shown under "Remarks." The employee must sign the "transfer" Personnel Action form.

c. *Voluntary Demotion*—A voluntary demotion may be made by the same procedure as a transfer, except that it is voluntary on the part of the employee in lieu of layoff, or to gain a more acceptable geographic location, or other similar reasons. On demotion, the employee must be reduced in salary to at least the next lower step in the salary range. The employee must sign the Personnel Action form. Mandatory demotion for disciplinary purposes is discussed in Article 11 "Disciplinary Actions."

Article 8—Merit Ratings

a. *Importance of Sound Ratings*—One of the most important requirements of a good supervisor is his ability to fairly and impartially evaluate his employees. The Highway Department "Personnel Merit Rating" is designed to focus attention on specific work traits, but the rating will be no more valid than the careful, considered judgment of the rater.

Merit ratings have become of primary importance as a device of sound supervision in the Highway Department. Not only are the ratings used as one basis for determining salary increases, but they are used by the Civil Service Commission as part of the score on examinations which in turn determine promotion.

For this reason, it is urged that time and care be used in rating employees. Try to rate in a manner which will differentiate between the poor, average, and exceptional employees in a given classification. Rating all employees high is not fair to the better employees and may result in poor employees being promoted.

The Highway Commission sets the passing score that determines which employees are eligible for a salary increase. This score may be raised or lowered by the Commission from year to year.

b. *Employee Notification*—An employee may see his rating sheet upon his own request —either to his supervisor or to the Personnel Division.

Article 9—Termination

a. *Layoff*—An employee may be laid off if a certain position is abolished, if there is a shortage of funds or work, if there is a material change in duties in the organization of a unit, or other similar reasons outside the employee's control, and which do not reflect discredit on the employee.

The supervisor must give written notice to the employees at least fifteen days before the effective date of the layoff. If the job is strictly seasonal, or short-term special work and an understanding is had with the employee when he is appointed, no such formal written notice is required.

The box "Layoff" should be checked on the Personnel Action form for this type of termination.

b. *Resignation*—To resign in good standing an employee must give at least fourteen calendar days notice, unless the supervisor because of extenuating circumstances agrees to a shorter period.

The employee must sign the Personnel Action form in order to effect a bona fide resignation. No coercion of any type should be used to persuade an employee to resign. If the employee's services are not satisfactory, he should be dismissed or other corrective action taken. (Dismissals are discussed in Article 11, "Disciplinary Actions.")

Article 10—Leaves of Absence

Leaves of absence with pay fall into the categories of vacation leave, sick leave, emergency leave, military leave, and other leaves such as that for jury or court duty and time to attend trade or professional meetings. The mone-

tary aspects of leaves with pay are recorded and controlled by the Accounting Division.

Leaves of absence without pay include sick leave (when not adequately covered by earned leave), military leave, leave for business purposes, and educational leave.

a. *Authorization for Leave*—Leaves of Absence without pay must be requested and authorized by means of Personnel Actions (form CS-124), when the period of absence exceeds eight business days for monthly rate employees.

Leaves of absence with pay must be requested and authorized by means of Highway Department form E-124 in all cases, except sick leaves of duration less than eight business days. A doctor's certificate must be submitted to the Accounting Division for all sick leaves in excess of seven days. The granting of leaves of absence with pay is within the authority of the employee's immediate supervisor.

b. *Vacation Leave*—The department has a bonus vacation plan which allows additional credit in earning vacation based on length of service.

Full time employees who have served at least one year are granted one day of vacation with pay for each full month of service.

Full time employees who have served continuously for five years earn one and one-fourth days vacation a month.

Full time employees who have served continuously for ten years receive one and one-half days vacation leave a month.

The supervisor is responsible for scheduling vacation to first meet the convenience of the department's work and secondly the convenience of the employee.

Vacation may be accrued up to a total of twenty-six days.

c. *Sick Leave*—Sick leave credit of one day will be allowed for each full month of service and for each fractional month during which the service exceeds one-half month. Sick leave may be accrued up to a total of ninety days.

Sick leave occasioned by accident while an employee is on duty shall be subject to the same regulations and limitations as sick leave occasioned by other cause. However, any compensation paid to the employee by the State Industrial Accident Commission for time for which the employee also receives pay from the Highway Department shall be deducted from the employee's pay. While being compensated by the Accident Commission, the charge against the employee's sick leave accumulation will be made at the rate of only one-half day for each business day of absence.

d. *Military Leave with Pay*—An employee who has worked six months and is a member of the National Guard or of the reserve corps of the United States Army, Navy or Marine Corps, or Coast Guard, shall be entitled to leave of absence from his duties without loss of pay or time during all days which he shall be ordered to duty with tropps or field exercises or for instruction for periods not to exceed fourteen calendar days in any one fiscal year.

e. *Military Leave Without Pay*—Any regular, trial service, conditional, or provisional employee will be granted military leave rights. This includes employees who enter the service through enlistment or induction. Such employees will be returned to their same or a similar position if they return to the department within six months after honorable separation from the service. If there are no vacancies, these employees will replace employees in a similar grade who have been employed in their absence.

f. *Educational Leave Without Pay*—Leave without pay for educational purposes will be granted only to those taking courses related to the work, i.e., those in engineering classifications must be taking engineering; those in the Materials Division must be taking engineering, chemistry, physics or related courses; those in Accounting must be taking business administration, accounting or economics; those in clerical may be taking a liberal arts course, etc. The reason for leave should be shown under "Remarks" on the Personnel Action form. Leave without pay for education is for one year only, and must be renewed if it is to extend to a longer period.

As an inducement to the student to return to the department an employee on bona fide approved educational leave without pay will have the time he is absent counted toward six months and annual increases.

Article 11—Disciplinary Actions

a. *Cause for Disciplinary Actions*—Any action which reflects discredit on the service or is a direct hindrance to the performance of High-

way Department functions shall be considered good cause for disciplinary actions. Such cause may include misconduct, inefficiency, incompetence, insubordination, indolence, malfeasance, disloyalty, or willful violation of the Civil Service Act or Highway Department regulations. The types of disciplinary actions in the order of severity are: formal admonition either orally or in writing; demerit resulting in a lowering of the annual merit rating score; suspension without pay; salary reduction; demotion and salary reduction; dismissals; and suspension and dismissal. Immediate dismissal, before any other action is taken, is the most severe of all discipline; it implies that the individual is not worthy of employment and has little potential for improvement.

b. *Suspension*—An employee may be suspended without pay for cause for a period not to exceed one month. The supervisor should notify the Personnel Division and the employee in writing not less than one day after the effective date. Such notice should include the reason for suspension and the duration. Also a personnel action form should be submitted.

c. *Salary Reduction*—An employee's salary may be reduced to any lower step in the salary range for cause. To accomplish this, the Personnel Division and the employee must be notified in writing at least five days prior to the effective date of the reduction. Also a Personnel Action form should be initiated.

d. *Demotion and Salary Reduction*—By notifying the Personnel Division and the employee five days in advance, an employee may be demoted for cause to a lower class and his salary reduced to any lower step in the lower range. In addition, a Personnel Action form should be initiated.

e. *Dismissal*—By notifying the Personnel Division and the employee in writing ten days in advance, an employee may be dismissed for cause. This type of dismissal is usually made where there is not an overt act, but rather the cause is general and prolonged—such as inefficiency, incompetence, absenteeism, etc.

f. *Suspension and Dismissal*—In such cases where there is an overt act—such as drinking intoxicants on the job, abusing equipment, outright insubordination, or other open and deliberate violations of department rules—it is desirable to effect an immediate and permanent separation. This is accomplished by immediately suspending the employee without pay for ten days with dismissal effective at the end of that period. The employee should be informed in writing of this act within 24 hours; and the suspension and dismissal may be recorded on the same Personnel Action form for notification to the Personnel Division and the Civil Service Commission.

Article 12—Retirement

a. *Eligibility*—The Public Employes Retirement Law was established in 1945, and has since been modified and improved by amendment. Any State employee who normally works more than six-hundred hours a year is required to become a member of the retirement sysem. New employees entering the State service must be employed for six months before becoming eligible for membership. The basic retirement forms and procedures are described below:

b. *Amounts on which an Employee Contributes*—Any employee required to be a member of the system must contribute on one-half of his monthly salary until he has earned his first $3,600. No employee may contribute on more than $3,600 of his salary in any given fiscal year.

However, an employee required to contribute on more than five percent of his earnings (i.e. a female becoming a member at the age of twenty-five or over; or a male becoming a member at the age of twenty-eight or over) may elect to contribute on only five per cent of his salary.

c. For the appointment of an employee who has not previously established membership in the Public Employes Retirement System, the following forms should be filled out: Form RS-7 "Personnel Record and Claim for Prior Service"; and Form RS-A25 "Notice of Election" (as illustrated). The supervisor should wait until a request is made by the Personnel Division for these forms.

d. For an employee who has previously established membership with the Retirement System, but has withdrawn his contributions, the following forms should be filled out: Form RS-A19, "Notice of Employment"; and Form RS-A25 "Notice of Election". There is a six months waiting period for these employees, and super-

visors should wait until a request is made by the Personnel Division for these forms.

e. For an employee appointed who previously established membership in the Retirement System, and did not withdraw his contribution, the supervisor should fill out Form RS-A19 "Notice of Employment" and Form RS-A25 "Notice of Election," and submit them to the Personnel Division immediately upon appointment.

f. An employee who terminates his employment, and has not reached his earliest retirement age may withdraw his contribution. The Form RS-A31 "Notification of Withdrawal" should be attached to the termination Personnel Action form and forwarded through approval channels to the Personnel Division.

g. The employee who has reached retirement age should submit form RS-M2 "Application for Service Retirement Allowance." This form is sent to the supervisor by the Personnel Division approximately one month before the employee's effective date of retirement. For an employee who wishes to ritire voluntarily and receive a reduced retirement allowance after reaching the earliest retirement age of 60, may do so at any time. The Personnel Division, upon notification from the supervisor, will send the proper forms for voluntary retirement. Form RS-M1 "Application for Disability Allowance" should be filled out for an employee terminating because of total disability. This form is sent by the Personnel Division only on the request of the supervisor.

h. An employee may elect to increase his rate from five percent to the fixed rate, or reduce from the fixed rate to five percent only *once* in any fiscal year. To do this Form RS-A25 "Notice of Election" should be filled out and all four copies sent directly to the Accounting Division.

i. An employee who wishes to change his beneficiary should complete in full, Form RS-11 "Request for Change of Beneficiary." This form will be sent to the supervisor upon request to the Personnel Office.

Article 13—Federal Social Security

In April 1953, the State entered into an agreement with the Federal Social Security Administration placing all State employees under the Social Security program; and giving employees on the time reports at that time retroactive benefits to January 1951. Social Security coverage offers employees certain survival benefits not obtainable under the State plan and also supplements the retirement allowance receivable under the State plan.

The State Retirement plan and the Social Security plan are separate systems and contributions are made and benefits paid separately.

Employees contribute to the Social Security plan at the rate of 1½% of the first $3,600 earned in any calendar year (this percentage is scheduled to increase to 2% January 1954.) There is no six-months' waiting period under Social Security, and employees start making contributions immediately upon appointment. The Federal W-4 form should be used as the means of submitting the employee's social security number. This is the only form necessary for the supervisor to submit for Social Security purposes. (This form also takes care of federal tax deductions.) Employees who have never been issued a social security number, should apply for a number from any local Social Security field office or Post Office as soon as possible after appointment.

Article 14—Bonded Employees

Resident Engineers, Transitmen, Inspectors, Checkers and other employees who are required to sign time reports, issue time checks or material receipts must be bonded. Bonds are in force only during the time that the classification is shown on the pay roll.

Requests for bonding should be addressed to the Construction Engineer, Salem.

CONSTRUCTION DEPT.
FORM E-219 2M 10-41

FILE NO. _____

OREGON STATE HIGHWAY DEPARTMENT
RECORD OF EMPLOYMENT

NAME Robert I. Boxer

PERMANENT ADDRESS 421 Grade St, Eugene, Ore. PHONE 438

NAME AND ADDRESS OF NEAREST RELATIVE Geo. B. Boxer, 421 Grade St, Eugene

AGE 27 HEIGHT 5' 10" WEIGHT 170 MARRIED No NO. DEPENDENTS None

CITIZEN OF U. S.? Yes YEARS IN U. S. 27 YEARS IN OREGON? 27

YEARS IN HIGH SCHOOL 3 COLLEGE 1 COURSE C.E. DEGREE No

CORRESPONDENCE SCHOOL _____ COURSE TAKEN _____ % COMPLETE _____

REPORTED TO ME ON Feb. 20, 1940 AS Chainman

CLASSIFICATION CHANGED TO Computor ON July 1, 1941

POSITION HELD LAST UNDER MY CHARGE Computor

NOW BEING transferred TO R.C. Cold LOCATED AT Roseburg AS Computor

REASON FOR CHANGE: ☒ TRANSFERRED ☐ RESIGNED ☐ DISCHARGED ☐ PROMOTED ☐ ILL

EFFECTIVE DATE OF THIS CHANGE Dec 1, 1944 ☐ WORK COMPLETED

INSTRUCTIONS: START CARD ON DATE EMPLOYE REPORTS. HOLD UNTIL CHANGE IS MADE, THEN COMPLETE CARD AND FORWARD TO DIVISION ENGINEER IMMEDIATELY.

SIGNED O.B. Brown
ENGINEER IN CHARGE

STATE PRINTING DEPT.

PERSONNEL RATING SCHEDULES

SCHEDULE NO. 1 CLASSIFICATION

NAME Robert I. Boxer CLASS'N 1

				X	Y	Z
1	PERSONAL CHARACTER AND INTEGRITY	SATISFACTORY	20	20		
		UNSATISFACTORY	0			
2	PHYSICAL FITNESS	FIT FOR ALL	20	20		
		FIT FOR LIMITED	10			
		UNFIT	0			
3	GENERAL DEPENDABILITY. (RELIABILITY, ACCURACY, PUNCTUALITY, ETC.)	EXCELLENT	30	25		
		GOOD	20			
		FAIR	10			
		POOR	0			
4	INDUSTRY	EXCELLENT	30	25		
		GOOD	20			
		FAIR	10			
		POOR	0			
5	JUDGMENT	EXCELLENT	30			
		GOOD	20	20		
		FAIR	10			
		POOR	0			
6	INITIATIVE, MENTAL ALERTNESS, AND WILLINGNESS TO ASSUME RESPONSIBILITY	EXCELLENT	30	30		
		GOOD	20			
		FAIR	10			
		POOR	0			
7	COOPERATION WITH ASSOCIATES	GOOD	20	20		
		FAIR	10			
		POOR	0			
8	PERSONALITY AND TACT	GOOD	10			
		FAIR	5	5		
		POOR	0			
9	QUALITY AND NEATNESS OF WORK	GOOD	10	10		
		FAIR	5			
		POOR	0			
	TOTALS, SCHEDULE NO. 1			175		

REMARKS: (EXPLANATION MUST BE MADE HERE IF DISCHARGED FOR ANY REASON) _____

X BY Brown Y BY _____ (DIVISION ENGR.) Z BY _____ (CONSTRUCTION ENGR.)

CS-124

Rates and Classifications: Checked | Recorded:

STATE OF OREGON
CIVIL SERVICE COMMISSION

Personnel Action

Personnel Action No. 1024-

Proposed Effective Date

Effective Hour

NATURE OF ACTION PROPOSED: (Check One)

01	☐ Request for Certification	11	☐ Restoration of Rights	42	☐ Demotion
02	☐ Emergency Appointment	33	☐ Establishment of New Position	65	☐ Layoff
03	☐ Temporary Appointment	34	☐ Reclassification of Existing Position	66	☐ Resignation
04	☐ Trial Service Appointment	35	☐ Name Change	67	☐ Retirement
05	☐ Provisional Appointment	36	☐ Address Change	68	☐ Death
06	☐ Conditional Appointment	37	☐ Status Change	7—	☐ Leave W/O Pay
07	☐ Unclassified Appointment	38	☐ Salary Change	75	☐ Termination of Emergency,
08	☐ Return from Leave W/O Pay	39	☐ Promotion	7—	Temporary or Seasonal Appt.
09	☐ Reemployment	40	☐ Transfer	8—	☐ Suspension ☐ Dismissal
10	☐ Reinstatement	41	☐ Voluntary Demotion	99	☐ Other (Explain under "Remarks")

	FROM	TO
Name		
Address		
Class and Class No.		
Status		
Salary	$ /mo.	$ /mo.
Department	Oregon State Highway Department	
Division		
Unit—No.		
Geographical Location (City, Dist., etc.)		
Name of Immediate Supervisor		

APPOINTMENT INFORMATION: Registration or Certification No. .....

Date of birth ..... ☐ Veteran ☐ Male

Place of birth ..... ☐ Non-veteran ☐ Female Beneficiary .....

Prior Member

Retirement System? ..... Ret. No. ..... Contribution withdrawn? ..... Prior Employe Hwy. Dept? ..... Year terminated .....

SEPARATION INFORMATION: (a) Reason for Separation (explain fully under "REMARKS").

(b) Would you be willing to reemploy in the future? ..... (c) Does separation reflect discredit on the employe? .....

EMPLOYE SIGNATURE: (Necessary in cases of Resignation, Voluntary Demotion, and Transfer)

I hereby voluntarily consent to the Personnel Action described above, without coercion or compulsion.

Date | Employe's Signature

CLASSIFICATION INFORMATION: (To be completed for all appointment, promotion or transfer actions)

(a) Name of last incumbent ..... (b) No. existing positions in this organizational unit in proposed class .....; No. additional proposed .....; (c) No. and titles of employes to be supervised by appointee to new position .....; (d) Names of one or more persons in organizational unit doing identical work .....

REMARKS and/or Job Description: (Give Highway Dept. Prior and/or Proposed Working Title)

Request made by ..... Foreman; Res. Engineer

Approval recommended ..... D. M. S.

Approved ..... Personnel Division

Approval recommended ..... Department Head—Division Engineer

Approval recommended ..... Staff Engineer

Last day on my pay roll .....

Signature of Person Initiating Transfer

CERTIFICATE OF APPOINTING AUTHORITY

I hereby certify that the facts stated above are correct, that funds are available for the action proposed, and that no deficit in salary and wage budgets will result from the proposed action.

Signature of appointing authority | Asmst. State Hwy. Eng.

OSHC Form A-245—(Rev. 10-35) (SEE INSTRUCTIONS ON BACK)

INSTRUCTIONS AS TO COPIES

REGULAR ACTIONS: On all actions, except "transfer" and "request for certification", submit copies 1 to 6, inclusive, through approval channels to the Accounting Division.

TRANSFER: On notice of transfer, submit copies 1 to 6, inclusive, to supervisor to whom employe is being transferred; he will complete the form for change in personal status, and forward the first six copies through approval channels to the Accounting Division

REQUEST FOR CERTIFICATION: Only the first 4 copies of the personnel action need be made. The green copy should be retained by the supervisor initiating the request, and the remaining 3 copies forwarded through approval channels to the Personnel Division. Do not under any circumstance show a candidate's name on a "request for certification."

Copy No. 2 or 3—FOR CIVIL SERVICE COMMISSION OR BUDGET DIVISION

NOTE: On "Request for Certification" submit this copy through approval channels to the Personnel Division.

ADDITIONAL REMARKS

THIS SPACE FOR CIVIL SERVICE COMMISSION AND BUDGET DIVISION

Unclassified

Date .....

Act, Sec. 10, Par. .....

By .....

Allocated to: Allocated by ..... Date .....

Class | Salary | List to be used

By Civil Service Commission:

☐ Approved By .....

☐ Noted

☐ Disapproved Date .....

Reason: .....

By Budget Director:

☐ Approved By .....

☐ Noted

☐ Disapproved Date .....

State Printing 61128

Employment Application

Personnel Division

OREGON STATE HIGHWAY DEPARTMENT

STATE HIGHWAY BUILDING

SALEM, OREGON

INSTRUCTIONS TO APPLICANTS: (1) Answer each question clearly and completely; (2) if you are applying for a specific examination which has been announced, be sure that you have read the examination announcement and complied with all the requirements; (3) all statements submitted on this form are subject to investigation and verification; (4) if more space is required, use separate sheet(s) of paper. **Fill in with typewriter or ink.**

☐ Mr. ☐ Mrs. ☐ Miss

Last | First Name | Middle | (Maiden Name)

Street Address or Route Number | Social Security No.

City | Zone | State | County | Telephone No.

Are you a full U. S. citizen? Yes ☐ No ☐

Are you a legal resident of Oregon? Yes ☐ No ☐

Date of birth: Mo. Day Yr.

Age in years

Marital status: Single ☐ Married ☐ Separated ☐ Widowed ☐ Divorced ☐

Number of dependents

Height: ft. in.

Weight:

Sex: ☐ Male ☐ Female

POSITIONS APPLIED FOR:

Acceptable minimum salary $.....

Are you a U.S. War Veteran ☐ Yes ☐ No

Are you a Disabled Veteran ☐ Yes ☐ No

What per cent rated disability? .....

IMPORTANT: If you are applying for a specific examination and wish to claim veterans' preference you must submit with this application satisfactory evidence of honorable separation from military or naval service unless such proof has already been submitted in connection with a previous examination.

Have you ever been discharged for cause from public employment? Yes ☐ No ☐

Have you ever been convicted of a crime other than a minor traffic violation? Yes ☐ No ☐

Do you have health defects or are you physically handicapped in any way? Yes ☐ No ☐

Do you object to inquiry of your present employer in regard to your character, qualifications or ability? Yes ☐ No ☐

Do you hold or are you a candidate for any political office? Yes ☐ No ☐

Are you an officer or committee member of any political party? Yes ☐ No ☐

Are you a member of the Public Employees' Retirement System? Yes ☐ No ☐

If any answer is Yes, attach full particulars on separate sheet; give retirement number.

Have you ever worked for the LIST BELOW YOUR EDUCATION AND TRAINING
Ore.Hwy.Dept? Yes No (Be sure to include any Military or Naval Training Schools or Courses) Name of beneficiary

Grammar school: Attended from Yr. to Yr. Location Diploma: Yes ☐ No ☐

High school: Name City State Attended from Yr. to Yr.

	GRAMMAR SCHOOL								HIGH SCHOOL			
Were you graduated? Yes ☐ No ☐ Circle highest school grade completed	1	2	3	4	5	6	7	8	9	10	11	12

Additional Schooling Other Than College or University: (Show name of school; location; subjects completed; total time attended and full or part time; kind of school, i.e., day school, night school, correspondence, etc.)

NAME OF COLLEGE OR UNIVERSITY	LOCATION	YEARS ATTENDED From / To	MAJOR
			MINOR
		HOURS CREDIT / YEARS ATTENDED: Quarter / Semester — 1 2 3 4	DEGREE
GRADUATE SCHOOL	LOCATION	WORK TAKEN	HOURS CREDIT / YEARS ATTENDED
		DEGREE	QUARTER / SEMESTER — From / To

List any additional licenses (including driver's and chauffeur's licenses), registration, scholastic honors or other qualifications not shown above:

Have you ever filed application before with the State Civil Service Commission? Yes ☐ No ☐ Date .....

For Personnel Action—Do not write in this box

Applicants Should Also Fill Out Reverse Side

REFERENCES (List 3 not related to you)

NAME	OCCUPATION	ADDRESS	PHONE No.
1.			
2.			
3.			

Certificate of Applicant: I hereby certify that there are no misrepresentations or falsifications in these statements and answers to questions. I am aware that any misstatements of material facts may cause rejection of my application and I may be disqualified from competing in any examination, or holding any employment in the State service.

Date | Signature of Applicant

FOR EXAMINER

Directions

Describe below any employment or occupation you have ever had which, in your opinion, tends to qualify you for the position sought. If your war service, if any, included experience pertinent to the position, be sure to include it. Begin with your most recent employment and work backward consecutively to your first one. If your title and duties changed materially in the course of your service in any one organization, indicate such changes clearly and as separate employments. All statements are subject to verification.

Using the following format or outline, list the information in a manner similar to the example below. Be complete. Use typewriter if possible. (If application is for draftsman, give at least a small sample of your freehand lettering.) Draw a line across the paper to separate each period of employment. Use as many extra sheets as necessary.

- EXAMPLE -

EMPLOYING FIRM: Oregon State Highway Department — ADDRESS: Madras, Oregon

DATES EMPLOYED: BEGINNING: September 1, 1946 ENDING: December 16, 1948 — SALARY: BEGINNING: $248 per month ENDING: $312 per month

NAME OF SUPERVISOR AND TITLE: John V. Kennedy, Resident Engineer

NAMES AND TITLES OF EMPLOYEES SUPERVISED BY YOU: (IF MORE THAN 5, LIST ONLY THE NUMBER) James E. Smith, Road Chainman; William F. Jones, Rear Chainman; Walter Q. White, Stakeman

REASON FOR LEAVING: To go into business for myself running a book store.

YOUR TITLE AND EXACT DUTIES: Transitman. On highway construction projects, figured grades, vertical curves and super-elevation for horizontal curves. Took, or supervised the taking of topography, cross-sections, and the setting of slope stakes and grades. Staked culvert pipes and small drainage structures. Figured and ran simple curves; figured inaccessible P.I. for curves. Sometimes figured land areas, cross-sections, and computed mass-diagrams.

(Start here with your most recent position.)

FORM RS-A 19
10M 1-50

ORIGINAL COPY

EMPLOYER'S NUMBER _____

DO NOT USE THIS SPACE

NOTICE OF EMPLOYMENT
TO
PUBLIC EMPLOYES RETIREMENT BOARD

EMPLOYE'S NAME _____ (FIRST) (MIDDLE) (LAST) NUMBER _____

EMPLOYMENT DATE _____ DUTIES - POLICE OR FIREMAN ☐ OTHER ☐ MONTHLY SALARY $ _____

LAST PREVIOUS PUBLIC EMPLOYER _____

EMPLOYER'S NAME _____ APPROVED BY _____

DO NOT FILL IN ANY SPACE BELOW

CONTRIBUTIONS WITHHELD BY PREVIOUS EMPLOYERS DURING THE CURRENT FISCAL YEAR ON SALARY NOT EXCEEDING $3000.00 PER YEAR:

CONTRIBUTIONS	SALARY SUBJECT TO CONTRIBUTIONS	FIRST DAY SUBJECT TO CONTRIBUTIONS
$	$	

NOTE: THE FIRST DAY SUBJECT TO CONTRIBUTIONS, CONTRIBUTIONS WITHHELD, NUMBER, NAME, PERCENTAGE RATE, YEARS OF PRIOR SERVICE, BIRTH DATE, NORMAL RETIREMENT DATE, CLASS, AND SEX ARE PRESENTLY REFLECTED ON OUR RECORDS AS SHOWN HEREON. IN CASE OF ERROR PLEASE NOTIFY US IMMEDIATELY.

PUBLIC EMPLOYES RETIREMENT BOARD

_____
(EXECUTIVE SECRETARY)

→ (SEE REVERSE SIDE FOR INSTRUCTIONS) ←

FORM RS-A25

EMPLOYE'S NOTICE OF ELECTION
TO
PUBLIC EMPLOYES RETIREMENT BOARD

EMPLOYER'S NUMBER _____

EMPLOYE'S NAME _____ NUMBER _____

EMPLOYE'S ADDRESS _____

FILE THIS FORM Otherwise your employer is required by law to withhold Retirement contributions on all of your salary, each payroll period, at the fixed rate.

I hereby notify the Public Employes Retirement Board that I elect to contribute on the following bases:

I-A. At the _____ (Fixed) rate; OR B. At the rate of _____ (5 per cent).

An employe whose rate of contribution to the fund is fixed at more than 5 per cent of his salary may elect to reduce his contribution rate to 5 per cent by notifying the Board to that effect, in which event HIS BENEFITS SHALL BE REDUCED ACCORDINGLY (Chapter 401, Oregon Laws 1945, Section 14). I understand that this reduction is permanent and that my employer's contribution will likewise be reduced.

II-C. On the basis of _____ (All) my salary; OR D. On the basis of _____ (Only) $200.00 per month.

An employe whose salary exceeds $200.00 per month shall contribute on the basis of all of his salary EXCEPT DURING SUCH TIMES as he elects by written notice to contribute on the basis of only $200.00 per month (Chapter 401, Oregon Laws 1945, Section 14).

Date _____, 19____. EMPLOYE'S SIGNATURE _____

SEE INSTRUCTIONS ON THE REVERSE SIDE OF LAST COPY

Form RS-A 31

THE STATE OF OREGON

WITHDRAWAL OF A MEMBERS ACCOUNT CANCELS ALL BENEFITS

....., Oregon, ..., 194.....

I, ..., ..., in accordance with the privileges
(Type or print name of employe) (P. E. R. S. Emp. No.)
granted by O. C. L. A., 90-716, hereby request a refund of my account balance. I certify that I am the identical person named in this request; that I have knowledge of the contributions made; that the refund of the account balance herein requested is due to me; and that no part thereof has been heretofore paid.

Person Making Certification Sign Here .....
(Employe's signature)

Please send my refund to: .....
(Type or print)

Post office address .....

(SEE REVERSE SIDE FOR INFORMATION)

SECTION 5. LOCATION SURVEYS

Article

1. Authority for Survey.
2. Relations With Property Owners.
3. Reconnaissance Surveys.
4. Reconnaissance Report shall Include.
5. Preliminary and Location Surveys.
6. Stationing.
7. Horizontal Curves.
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43. Comparison of Lines.
44. Projected Lines.
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46. Classification on Surveys.
47. Care of Instruments.

LOCATION SURVEYS

Article 1—Authority for Survey

(a) Before starting a survey, either reconnaissance, location, revision, quarries, stockpile sites or for any other purpose, an authority for survey must be submitted to and approved by the State Highway Engineer. This is to be made on Form E-39, Authority for Survey, in triplicate, and should show all information called for on the form. It must be used for all surveys except where they are covered by a previous authorization or are properly a part of the construction engineering.

(b) Accurate costs of the survey as it progresses will be kept by the field engineer. If it is found that the survey cannot be completed within the amount set up, request for additional authorization will be made on the same Form E-39, showing the revised estimate for completion of the survey and accompanied by a letter explaining the reasons for the request for additional authorization.

Article 2—Relations With Property Owners

(a) Nearly all surveys are made on property not yet acquired by the State. Occasionally a property owner will be found to object to a survey being made across his property. The Locating Engineer usually has some knowledge of any unfavorable attitude on the part of the property owners, and in such cases the owner should be contacted and his permission secured for making the survey, explaining as far as practical the reasons why it is necessary to enter the property. If the permission is definitely refused, a traverse around the property may be made if practicable, the Division Engineer notified and further work within the limits of the property in question delayed until instructions are received from the Division Engineer.

(b) In all cases care must be taken that the least possible injury or damage will be done to property. An account will be kept of apparent damage, whether necessary for the progress of the survey or accidental. Particular care must be taken when crossing fields of growing crops, when going through orchards, and in the matter of cutting merchantable timber or valuable shrubbery. It must be remembered that the State is liable for the cost of all damage done to property by a survey party.

Article 3—Reconnaissance Surveys

(a) On reconnaissance surveys it is expected that the field information will be only approximate, and therefore, any greater refinement will not be necessary than can be obtained with compass, chain and barometer.

(b) The engineer will provide himself with all available maps of the area to be studied, par-

ticularly those showing topography (such as USGS quadrangles). He shall determine the class of highway and the maximum grade and curvature for which the reconnaissance is to be made from the Division Engineer of the division in which the survey is being made, bearing in mind that the maximum is to be used only where the use of anything below the maximum will materially increase the cost.

Article 4—Reconnaissance Report Shall Include

(a) A small scale map of the area, usually on a scale of 2,000 feet to the inch. It should be as complete as the scale and information secured will allow. This map should show all lines investigated, giving mile posts, mileage, and equations at junctions; it should also show quarry sites and gravel pits, all prominent topographical and cultural features, such as streams, ridges, towns, railroads, and existing roads, trails and highways, elevations of summits, stream crossings, etc. The map is to be made in size that can be folded to standard 8½" x 11" letter size.

(b) A condensed profile, separate or preferably a part of the above map on a scale of 500 feet to the inch vertical and 5,000 feet to the inch horizontal. This also should be made to a size that can be folded to letter size if separate from the map.

(c) A small scale map, preferably on sheet 8½" x 11", or multiple, showing lines only, with total cost by sections, and mileage of sections.

(d) A written report containing a description of each route must be given, calling attention to all unusual or extraordinary conditions affecting cost of construction or maintenance, such as:

Highway and railroad crossings.

Snow exposure, with particular reference to drifting.

Navigation channels.

Proposed and existing dam locations.

Scenic values.

Volume of traffic.

Possibility of freeway where Class A or B highways are being considered.

A detailed estimate of cost of each route by miles, summarized by sections between junction points. A tabulation of length, rise and fall, length and amount of maximum grade, total curvature, class of roadbed, maximum curvature, and total cost for each route or combination of routes. Description of materials for surfacing and their location.

Article 5—Preliminary and Location Surveys

Before starting a location survey, the engineer should thoroughly study the reconnaissance reports, and satisfy himself that the conclusions of the reconnaissance engineer are sound. He should note if any natural or artificial conditions have been changed since the reconnaissance was completed and determine their effect on the conclusions of the reconnaissance engineer.

If it is decided that one particular route shown in the reconnaissance report is much superior to any other, the procedure is simplified, and his work becomes more a matter of detail. In this case, he will run a preliminary transit line, take topography enough to cover all possible projections along the route. Soil samples should be taken as early as possible in order that the information be at hand when projections for locations are made.

A map on a scale of 100 feet to the inch shall be started at the time of beginning the work, and all information platted on this map as fast as it is received from the field. After this work is done, as many tentative locations may be projected as seem necessary to determine the best possible location. Profiles of these projections should be made. A study of these projections will enable the locator to make the choice of the final location.

The projected lines may be computed and the courses run in directly or, in open country it may be easier to scale off the distances on the map and locate the P. I.'s or other points on the ground, connecting up with the tangents as projected. With either method ties should be taken at frequent intervals in order to be certain that the located line bears the same relation to the preliminary that the projected line does. Since the map is made from coordinates of the preliminary line, these ties are necessary in order that the located line be shown on the map in its true relation to the preliminary line and the topography.

In cases where the locating engineer is furnished with a topographic map of the area made from aerial surveys, on either a scale of 100 or 200 feet to the inch, the preliminary lines may be omitted and the location staked from projections made on such maps. Additional preliminary or base lines for topography may be run, however, whenever it appears that the best location will

involve territory not covered by the aerial survey.

Article 6—Stationing

On all new work, and as far as possible on old work, stationing will run from north to south and from west to east. Stationing shall be continuous, a revision starting with the stationing of the point of beginning on the old line, enough of which should be shown on the map to clearly show the tie to the old work. An equation shall be made in stationing at the point of divergence, even though the stationing used is identical. The relation of the bearings used on the old and new lines should also be clearly shown. The above applies to both preliminary and located lines, which shall be differentiated in the field, and in the notes and on the maps by using the prefix P for preliminary lines and L for located lines. If more than one preliminary line or located line is run, the additional lines shall be designated P^2, P^3, L^2, L^3, etc. The first P or L line is presumed to be the P^1 or L^1 line, but it is not necessary to so designate it. Only actual preliminary lines should be called P lines and only actual staked located lines as L lines. Lines run merely as bases for taking topography shall be called T lines. The stationing of all additional P, T or L lines shall be continuous with the stationing of the main line from which they diverge with the equation shown at point of junction. Projections before staking as locations or those projections not staked shall be designated as A, B, C, D, etc., lines and in some cases carry names in addition to the letter. Equations and angle ties or equations in bearing should be shown at intersections of all lines and more particularly where preliminary and located lines tie into previous work. If the old lines cannot be recovered then an approximate equation shall be given and noted as approximate. Where a new line crosses an existing road, obtain center line stationing of both roads at the point of intersection and show on maps and profiles of the survey.

In making location surveys for two lane highways the general practice has been to stake or lay out the located line as the center line of the construction and of the right of way. Cases are appearing where it is planned to build four lane highways either now or at some future time. In such cases the staked location shall be the center line of the lanes to be first constructed, and all right of way descriptions shall be referred to this line.

When it becomes necessary to stake the center line of the next two lanes, the stationing of the original location shall be followed as near as physically possible, even though it necessitates equations at the ends of each curve. In other words, stations on all tangents where the two lines are parallel shall be identical.

Article 7—Horizontal Curves

All curves shall be spiraled and so shown on the plans submitted. This applies to secondary as well as to primary highways, except that on some of the less important secondary highways where the alignment is of a very low standard, spirals may be omitted but only upon the approval of the Construction Engineer.

The highway spiral as adopted by the Oregon State Highway Commission is printed in book form and may be requisitioned from the Equipment Department. These books will be charged to the engineer or other person in charge, and he will be held responsible and accountable for the book.

The minimum degree of curve, consistent with right of way conditions and the topography, will be used in all cases.

Curves shall be calculated on the basis: That the radius of a one degree curve equals 5729.58 feet, and that of any other curve is inversely proportional to the degree of curve.

The chord length used in measuring a curve should approximate the length of the true arc as closely as is practicable without causing a material error; therefore, the following lengths shall be used: For all curves up to an eight degree, 100-foot chords; from 8 to 16 degrees, 50-foot chords; from 16 to 32 degree, 25-foot chords; and from 32 to 56 degree, 10-foot chords.

The maximum degree of curve allowed will be found in "Roadbed Design Standards" (Section 10), except as it may be modified by the State Highway Engineer. At all times effort should be made to obtain the flattest curve possible, considering cost, and the maximum allowed is to be used only when its use will materially reduce the cost.

The use of compound curves will be permitted only upon approval of the Construction Engineer.

Article 8—Stakes and Hubs

The stakes used for the survey should be of durable wood. Marker stakes to be ¾" thick by 2" wide, surfaced on both sides, and 18" to 22" long. Hubs used for transit points should be 2" by 2" and 12" to 18" long.

When working in timbered country, it is sometimes possible to obtain cedar or straight grain fir along the line. When such is the case, it is desirable that this material be utilized for stakes and hubs.

Cup hubtacks shall be used in setting transit points.

Hubs for transit points shall be driven flush or slightly below the ground surface.

A guard stake shall be placed approximately 18 inches from all transit points and should slant toward the hub and have the index letter of the line and the station number marked on the side facing the point. On preliminary lines the guard stake shall be marked on the back with a circle having a dot in the center to indicate a point on tangent. The guard stake for a P. O. T. should be set to the left of the point. A triangle with a dot in the center will be used to indicate an angle point and shall be set on the outside of the angle. On located lines the initials of the words designating the point, such as, P. T., P. S., P. O. T., etc., shall be marked on the back of the guard stake.

Stakes shall be set at full stations and plus fifty points, except that where the ground is very uniform on tangents, the plus fifty point may be omitted.

Black crayon is preferable to blue for marking stakes. Station or points chained to shall be marked by a small wood plug driven flush with the ground at the exact point measured to and the marker stake placed about 3 inches ahead of the point. Where the ground is too hard for driving stakes, as in surfacing or pavement, a nail driven through a tin washer will identify the spot for future reference. In this case the marker stake will be offset, facing toward the line, with offset distance marked in a circle near top of stake.

Article 9—Transit Points

Transit points should be chosen so the hub is not likely to be disturbed. In cultivated country they may be placed near cross fences where they are not likely to be plowed out or otherwise disturbed. If the transit point is anything else than a hub the notes should show it as such.

Article 10—Chaining

The head chainman should be alert and active as the progress of the party depends a great deal on his ability to line himself in quickly and keep the axemen on line and the chaining up with them. He should be able to pick out suitable places for transit points which will afford as long a sight distance ahead as possible.

Chainmen must use plumb bobs each time a measurement is made, and both chainmen should call their respective stations. The rear chainman should see that the stake has been marked correctly.

On surveys where more than average accuracy is necessary, such as base lines for triangulations and surveys through congested areas, correction for temperature shall be made on distances between transit points if the temperature varies more than 10 degrees from the standard of 68 degrees.

For steel tapes up to 100 feet supported throughout, a pull of 10 pounds shall be used; any distances over 100 feet shall be measured with a 20-pound pull. For tapes supported only at the zero and 100-foot points, a pull of 22 pounds should be used.

Stations should be chained to the nearest one-hundreth foot and shown on the map in this manner.

Article 11—Angles

The measurement of angles shall be repeated a sufficient number of times to insure a high degree of accuracy. On preliminary lines and other lines used as a base for surveys, the angle should be turned at least 12 times and the accumulated vernier reading reduced to an average. On surveys tied to the Lambert system of coordinates, the above is especially important. In turning a "set" of angles it is essential that the transit be reversed for one-half the number of angles turned to eliminate any error that may be in the instrument.

Article 12—Accuracy of Survey

It is expected that surveys will close with an error of not more than 1 in 5,000.

Article 13—Lamberts System of Projection

The system of Lamberts projection shall be used on location surveys whenever possible. Ties shall be made to existing triangulation stations and Lamberts coordinates for convenient points shall be calculated for use as a basis for the plane coordinates to be used throughout the survey. Azimuths to be used along the traverse shall also be determined from these triangulation computations. For long surveys it is advisable to make additional ties to the basic triangulation network at intervals along the route of the surveys and establish other triangulation stations. These are useful in checking the work accomplished and help to keep the survey within the allowable limits of error. If the survey extends more than 10 miles from a triangulation tie and another tie is impossible then a solar of polaris observation should be made to furnish a check on the azimuth.

When establishing a triangulation station, for use as a basis for coordinates and azimuths, consideration should be given to the permanence of the location as well as to its convenience to the line. A little investigative field work in this respect will be found beneficial. It should be borne in mind that the triangle which is nearest to equilateral will lend itself best to angle adjustment. Sharp angles are to be avoided. Occupy as many known triangulation stations as possible when tying in a new station and distribute the error in angle closure among the angles. For ordinary work spherical excess may be disregarded. Third order accuracy requires that the angle error should not be greater than 6-seconds and the distance closure not more than 1-foot in 5,000.

Measurements of the angles involved in triangulation shall be accomplished by "winding" and "unwinding" the angle on the plate at least six times with the telescope direct and six times with telescope inverted. It will be found advantageous to start the plate readings at some arbitrary reading near zero rather than to try to set on exactly zero. This system assists the observer when making his final reading.

Newly established triangulation stations shall be marked with the standard bronze triangulation monument disk (available on order to the Salem Shops) and the usual white guard post shall be set beside it. Names for such new stations may be recommended but must be approved by the Construction Engineer before the actual stamping is done in order that duplication of names may be avoided as far as possible. A description of the new station, including complete details regarding the route to be followed in reaching it from some well known town, shall be furnished to the Construction Engineer for forwarding to the USC&GS. Also, whenever one of the known triangulation stations is occupied and the description is found to be inadequate or need revision, a report shall be made of the true circumstances so that the records can be corrected.

While the new triangulation station is being occupied, permanent azimuth mark shall be set either on line or on some easily referenced point and the azimuth of the line to it determined for use on all future work. This furnishes a local grid azimuth which can be used directly in the extension of coordinates to future points along any traverse in that immediate area.

Maps shall be drawn to the Lambert coordinate base and this fact shall be noted in the title. A sketch of the triangulation ties shall also be given either on the map or on a separate sketch and all angles and distances shall be included. Section corners and other monuments tied into the survey shall have their Lambert coordinates shown directly on the map along with the angle ties to them. Both grid bearings and true bearings shall be determined and shown on the maps for use in property descriptions and for future reference. Care must be exercised that the two sets of bearings can be easily distinguished from one another.

Further information regarding the use of the Lambert Projection, including tables, maps and explanatory information, will be found in the Construction Department letter dated May 1, 1944. Copies of this letter are available at the Salem office.

All lines shall be platted by coordinates, using the Lambert system where possible. Ties should be made to all permanent monuments within reasonable distance or visibility. All grid bearings shall be marked (Grid) on the detail map. After final location is made, azimuths of tangents shall be converted to true bearings, taking into consideration convergence of the meridians, and the proper equations shown.

Article 14—Bearings

Where azimuths cannot be obtained from lines between triangulation stations, true bear-

ings shall be obtained by observations on Polaris and an equation between the original bearing given at the beginning and end of the survey. In addition, equations in bearing shall be given at the nearest property line where the convergence of meridian amounts to as much as one minute. In short all bearings of all surveys should check the true astronomic bearing within one minute.

All ties, etc., obtained from sources other than actual field work are to be shown on the map, enclosed in parentheses. Where there is a difference between the field and deed or plat records, both should be shown, the field work in the regular manner and the deed or plat data in parentheses.

Extreme care should be taken that all bearings shown whether grid or true, are accurate. In some instances descriptions might be written based on State Highway bearings and conflicting with deed descriptions or other surveys where those might be more accurate than our own. There should never be any doubt as to the absolute accuracy of any bearing shown on a State Highway survey.

The source from which bearings are taken should be shown on all 100-foot maps.

Article 15—Section Ties

Transit ties shall be made to all section or subdivision corners, donation land corners, county survey corners, city monuments and all other corners marking property subdivisions. It will not be necessary to show the actual field tie to corners on the map, but the station of the intersection of centerline of the survey and the subdivision line, the angle of the intersection to the corners, on both sides of line, shall be shown on the 100-foot detail map. Intersections on curves shall be computed and angles shown to the tangent of the curve.

Whenever any legal subdivision corner tied to under this Article is found to be in bad order, or if in the process of surveying, any such corner is damaged, such corner shall be repaired or reestablished and copies of the notes forwarded to the County Surveyor and/or City Engineer for filing and recording.

Article 16—Survey References

Generally it will not be necessary to reference preliminary lines, but if considerable time is to lapse until the location is made, all transit points on the preliminary location shall be referenced.

Reference points shall be placed well out of the way of construction operations.

When practicable, line points should be cross referenced with the referenced lines placed at approximately ninety degrees to each other, and should consist of four points, with the point being referenced in line with the two legs of the cross reference. The included angle should be recorded as well as the angle from the tangent to the nearest reference line.

Reference hubs should be sound durable wood and long enough so when driven down flush with the ground surface they will be firmly set. The distance to reference points should be carefully noted, in case the points on one reference line are disturbed or lost, the alignment point can be re-established by measuring on the other line. In timbered country the farther reference points should preferably be placed on the side of trees, or on stumps if the wood is sound.

All reference points shall have guard stakes placed near them, on which shall be marked the letters R. P., initial of the line, station and kind of point referenced, as R. P. P. S. L^2 148 + 26.61.

Article 17—Location of Permanent Monuments

Ties shall be taken to all existing monuments adjacent to the line of survey. Enough permanent monuments shall be established to adequately and permanently reference the line.

Permanent monuments shall be placed in such a way that they will serve as a reference mark for the horizontal control as well as for vertical control, taking care always that the position chosen is well outside possible interference from construction. Whenever possible, the point of intersection of tangents, a point on a semi-tangent, or semi-tangent produced shall be used as location for such permanent monuments. In the case of tangents exceeding one mile in length, the monuments may be set to mark the right of way line.

Article 18—Azimuth to Monuments

Each permanent monument shall have at least one azimuth mark, preferably the next monument along the line, but if this is not visible, the azimuth shall be taken to the best and most easily identified mark available, even a nail in the blaze on a tree if nothing better can be found.

Article 19—Moving Permanent Markers

Before moving a permanent monument, it shall be referenced so that it may be accurately re-established. In some cases where the mark is to be slightly covered and not subject to further disturbance, it may be better practice to set reference marks indicating the position of the original mark.

Article 20—Reference Monuments

If it is found necessary at any time to construct reference monuments for re-establishing permanent monuments they shall be constructed in the same manner as permanent monuments.

Article 21—Monuments Found in Bad Order

Permanent monuments found in bad order or below standard shall be repaired.

Article 22—Identify Monuments

The greatest care should be taken to properly identify marks. A thorough examination should be made of all stampings on the posts or plugs and these stampings should be incorporated in the notes submitted. Errors frequently occur due to failure to identify marks properly. Particular care must be taken to differentiate between USGS and USC&GS marks. Be sure that you do not classify a reference point as a main station. The reference disks have an arrow cast in the top instead of a triangle.

Article 23—All Permanent Monuments to be Shown on Maps

All permanent monuments shall be shown on the location maps, both one hundred foot and four hundred foot, but ties may be omitted on the four hundred foot map.

Article 24—Obtain Permission if Necessary to Set Monuments on Private Property

When permanent monuments are placed before purchase of right of way, or if placed outside the right of way, permission must be obtained from the property owner. As far as possible, however, monuments must be within or on the line of the right of way.

Article 25—Standard Monument Construction

Each control or reference line monument shall be of good quality concrete and shall be constructed in place. It shall be not less than twelve inches square at the top, enlarging toward the base on a batter of one inch per foot. It shall have the top at or slightly above the surface of the ground. Its depth in the ground will vary with ground conditions, but shall generally be 3 feet in western Oregon, and in the higher mountains and eastern Oregon 3½ feet or more. A standard bronze disk requisitioned for such purpose from the equipment department will be set in the concrete, flush with the top of the monument, on which after the concrete has hardened, the tangent will be defined.

Article 26—Standard Monument Guard Posts

Standard guard posts for identifying permanent monuments shall be requisitioned from the Sign Department.

Installation of guard posts shall be made by the resident or locating engineers' forces before submission of the final records.

All guard posts shall be located two feet from the monument and at the depth indicated on the following sketch. This applies to permanent monuments only and not to right of way markers.

Article 27—Level Line Datum

The datum of all level lines shall be based on the sea level elevation as established by the United States Coast and Geodetic Survey through the medium of the Pacific Northwest Supplementary Adjustment of 1947 except where such adjustment is not available. In those areas where such information is not available the 1929 datum shall be used. All level lines as shown in United States Coast and Geodetic Survey Special Publication 177 and all issued by this department before 1947 are subject to revision to agree with the adjustment of 1947. Many of these lines have been adjusted to the 1947 adjustment and are available on request. Each profile made in accordance with the above 1947 adjustment shall bear the note United States Coast and Geodetic Survey 1947 Datum. If for some reason it is impossible to use this datum, the proper datum shall be indicated on the profile.

All new surveys should tie to previous work, at the beginning and end of the surveys and at intermediate points if possible. In addition to the horizontal ties to be made as noted in Article 6, the equation in levels between the old work and the 1947 Datum shall be shown.

Article 28—New Level Lines

Resident and Locating Engineers shall carry accurate levels over their projects and level lines shall begin and end on permanent bench marks. Bench marks of semi-permanent character shall

be established not more than 1,000 feet apart and at the crossing of every considerable stream where a structure will be required, and also at some convenient point near the crossing of each existing highway or railroad. These may be nails in roots of trees, marks on large boulders, etc. Marks on telephone and electric power poles, fence posts, etc., are to be avoided wherever possible.

On all work where great accuracy is not required, the rod shall be read to hundredths of a foot on turning points and hubs, and elsewhere to tenths of a foot. A rod reading shall be taken at all line stakes and at intermediate points where the ground surface varies materially from a uniform line between stakes. Readings shall be taken at the crossing of all ditches, fences, telephone, telegraph and power lines, etc. Where the survey crosses a railroad, a reading shall be taken to hundredths of a foot on the top of each rail and to the nearest tenth of a foot on the top of the tie at the intersection of the center lines. Readings shall also be taken along the center line of the track for a distance of approximately 1,000 feet each side of the center line of the survey. (See Section 11, Articles 10 and 11, Vicinity Maps.)

An elevation to the nearest tenth of a foot shall be taken at the water surface of all ponds and streams. The profile of the stream bed may be taken by soundings if necessary. High water marks shall be determined from the best information available, at all considerable stream crossings.

The center line elevations of intersecting roads shall be taken for a sufficient distance to insure ample data to design a connection to the new highway location.

Before a project is completed, permanent bench marks shall be established and their elevations determined to at least third order accuracy. In selecting sites for permanent bench marks, advantage should be taken of concrete culverts, siphon boxes, bridges and other permanent structures. If no suitable location for a bench mark is available along the right of way, it may be placed on private property after permission has been obtained from the owner. Instructions pertinent to the construction of permanent monuments may be found in Section 5, Articles 25 and 26 and in sketches at the end of the section.

Bench marks that are to be included in the published records of the level network shall not be set on spur shots. Such marks shall be used as a turning point in the line between two established bench marks or as a turning point on a return line to the starting bench mark. Permanent bench marks shall not be established farther apart than one mile.

Article 29—Accuracy of Bench Mark Levels

Elevations for new bench marks shall be established with Third Order accuracy which permits an allowable error of not more than 0.05 times the square root of the length of the circuit in miles. Divergence between lines run between two marks shall not be greater than 0.035 times the square root of the distance in miles. To attain this accuracy a target must be used and the rod must be read to the thousandth of a foot. Backsights must be balanced for distance and turning points should be carefully selected.

Article 30—Adjustment of Level Circuits

All level lines except those involving permanent bench marks shall be adjusted in the field. Complete notes for permanent bench level lines shall be forwarded through regular channels to the Construction Engineer for adjustment. These notes will not be considered complete unless they include ties to other permanent bench marks with adjusted elevations.

The level notes shall give the identification numbers stamped on the disk of each permanent bench mark leveled on. The approximate distance between these marks shall also be indicated in order to permit intelligent adjustment of the level circuit.

Article 31—Report on Bench Mark Recoveries

Locating and Construction Engineers shall conduct a search for and install, wherever needed, a standard 4" x 4" marker post alongside all permanent bench marks throughout the full length of the section being surveyed or under construction.

Upon completion of each survey and construction project, a "Report on Bench Mark Recoveries" form shall be submitted in triplicate.

A "Description of Bench Mark" from E-185 shall be submitted with the level notes for each permanent bench mark established. Indentification numbers for such marks will be furnished by the Salem office and these identification numbers shall be stamped in the disks by the engineers' forces along with the year of the

installation. Elevations shall not be stamped in the disks without direction from the Construction Engineer.

Whenever a permanent bench mark is destroyed or whenever its description should be revised to meet existing conditions, a "Report on Condition of Bench Marks" form E-186 should be completely filled in and submitted to the Construction Engineer.

Article 32—Topography to Include all Physical Features

Show all of the physical features that are necessary to make a complete topographical map of the country traversed, to such width on each side of the center line as may be necessary for correct projection of a location. The following are offered as suggestions, and if other features are encountered in the field, they are to be included in the records.

(a) *Fences*—When traversing an existing road, distances shall be taken to the fences at frequent intervals and intersecting fences shall be tied.

(b) *Intersecting Roads*—Intersecting roads should be noted with respect to grade, direction and distance to nearby towns.

(c) *Pole Lines*—Locate accurately the poles of telegraph, telephone and electric power lines, at the points where it may be necessary to move them. Note the name of the owners, pole numbers, number of wires, etc.

(d) *Buildings, Orchards*—Locate buildings, orchards, improved lands, etc., adjacent to the proposed location and ascertain the names of all owners of such property.

(e) *Show Type of Lands*—Designate whether cleared, timbered, logged-off, burned over or cultivated lands, etc.

(f) *Irrigation Ditches*—Note irrigation or other ditches and show the direction of flow and the grade. Give center line station of crossing.

(g) *Streams*—Note the names of all streams crossed by the line and determine the high and low water stages. Make an estimate of the probable size of opening required. If the stream is crossed by other roads, or a railroad in the vicinity, make a note of the location of the structure and the size of its opening.

(h) *Locate High Water Marks*—Note if the land at a proposed crossing is flooded by backwater. Also note other streams in the vicinity of the line, though not crossed by it, which may affect the location of the proposed road.

(i) *Bridges*—When crossed by center line, give stationing at both ends, width of roadway and type of bridge.

(j) *Character of Country*—Show the character of the country traversed, as clay, rocky, marshy, etc.

(k) *Railroads*—Show center line stationing of both highway and railroad and the angle of crossing. Tie in head blocks, switches, culverts, bridges, etc.

Article 33—Sketch Topography in the Field on "P" Lines

All topography on preliminary lines must be sketched in the field on sheets in such a way that it can be transferred directly to the maps. In order to accomplish this, the following method shall be used:

The preliminary line having been accurately platted on the 100-foot to one inch detail map, sections of the line will be accurately traced on sheets of vellum tracing paper approximately ten inches wide by thirty inches long, taking care that the prelminary line is as near the center of the sheet as possible. This may be platted in red ink. Pencil lines are then drawn at right angles to the center line at all even stations and all others where the level notes show it is probable that cross sections should be taken. All angles in the preliminary lines shall be split with a protractor. These pencil lines shall be drawn across the full width of the sheet of tracing paper. The stations and pluses shall be marked at one edge of the sheet and the corresponding elevations at the other edge at the ends of the pencil lines crossing the sheet.

The topographer will then take the sheet into the field, thumb tacking it to a drawing board of convenient size, and as the rodman calls out the different points, scale them accurately on the sheet, and sketch in the contours between the different stations as they appear to him on the ground. This method locates accurately the position of all contours opposite the stations as well as any other method and in addition locates the position of the contours

between the stations more accurately than other methods.

In addition to the contours, all cultivation, improvements, natural and artificial topographical features shall be sketched in accurately. Record of the measurements to important features shall be preserved.

When the sheets have been brough in from the field, the draftsman will transfer the topography to the detail maps. This can be done by either of two methods or by a combination of the two. For fairly open topography the contours can be transferred by tracing them with a fairly sharp metal stylus after the sheet has been accurately placed and fastened to the map. The contours will appear on the detail map as slight indentations, which can then be inked. Thin hard carbon paper may also be used, the contours being traced with a soft pencil. Regular or soft carbon paper will leave smears of carbon on the map. In cases where contours are close together, making identations hard to follow, the carbon paper method is to be followed.

Great care must always be taken in the field that the stations on which topography is taken correspond exactly to those shown on the vellum tracings and that the topography is taken at right angles to the center line.

Right angle lines can be run by use of two stakes nailed together at exactly right angles to each other, fastened on top of a stick three or four feet long. Nails should be driven in the ends of the stakes for sighting. Very accurate right angles can be turned in the field by this method. For splitting angles, a cardboard protractor can be easily made and used in the same manner.

More important features should be tied in with transit and tape and the notes recorded. (See Sec. 7 for Sample Topog. Sheet.)

Article 34—Road Approaches

Road approaches shall in general be reconstructed at the original location to fit the new grade. However, they should be placed in the most convenient places for the owner's use, but without creating undue traffic hazard.

Road approaches are to be constructed to a width adequate for their use, with 20-foot radius curves at the turnout from the highway. Side slopes shall be such as would be used on regular highway cut or fill slopes.

Road approaches are to be improved to a condition at least equal to their condition prior to the construction.

Article 35—Change in Grade on City Streets

When data is submitted for changes in grades along city streets which must be ratified by ordinance passed by the city councils, grades to be established shall be shown at all grade breaks and at all intersections of center lines and gutters of all cross streets and alleys.

If the city has datum other than "U. S. 1947 datum, grades shall be shown in both data or the equation plainly marked on all profiles and maps submitted for that purpose.

Article 36—Mile Posts

Position of mile posts must show on all maps and profiles.

Article 37—General Instructions for Surveys

(a) No revision of an existing highway alignment should be attempted without having the latest map of the alignment, which can be obtained from the Construction Engineer at Salem.

(b) At the point where a line revision leaves the existing highway, the original stationing and bearing shall be used and carried forward; an equation with the original stationing and bearing being given at the end of the revision. On major revisions, an equation in bearings should be made at both the beginning and end of the revision.

(c) The survey for a revision should be a complete survey in itself and no dependence placed on the topopgraphy and property lines shown on old location maps.

(d) The accurate location of section corners and property lines is very important. The actual field ties to section corners and property lines shall be shown on the 100-foot location map.

(e) The ties to lot and block corners and property lines should preferably be shown by angles rather than bearings as sometimes the bearings are changed along the center line and the bearings of other lines on the map are overlooked. If angles are used, the bearings along the center line may be changed without affecting the relative position of any point or line which may be tied to the center line.

(f) Where the location runs adjacent to a railroad, frequent ties should be made between

the center lines of the highway and railroad, which will enable the exact relationship of the two lines to be determined. All field ties are to be shown on the map.

(g) All question as to the exact location of the center line should be settled before any right of way descriptions are written.

(h) The 100-foot scale location map is primarily a right of way map and all information necessary for the writing and checking of right of way descriptions, encroachments, etc., should appear on this one map. The map should be as continuous as possble. Sending in separate maps for disconnected pieces of right of way will not be countenanced. All right of way descriptions are checked in the Salem office prior to the preparation of deeds and this checking cannot be done intelligently from small, disconnected fragments of the map.

(i) When the map is completed, it should be forwarded to the Salem office, where a tracing will be prepared from which additional copies may be made. The original will then be returned (with additional copies, if desired). When the right of way descriptions are sent in to the Salem office, they are there checked with the same information from which they were prepared.

(j) When any alterations are made on the original map, the necessary data should be forwarded to the Construction Engineer, Salem, so that the tracing may be corrected.

Article 38—Location Cross-sections

Cross-sections shall be taken at all breaks in the ground surface and shall be of such width each side of center line as to definitely extend beyond the limits of the slope lines of the contemplated construction.

An interval of not to exceed 100 feet between sections may be used in flat country and 50 feet in rolling country. All readings shall be taken as plus and minus from the ground elevation at center line. For form of notes see Sec. 7.

Generally, a scale of 10 feet to the inch shall be used in platting cross-sections for grading jobs. On revisions, etc., in cities a scale of 5 feet to the inch may be used.

Location cross-sections shall be platted on rolls of 10 x 10 cross-section paper.

Article 39—Earthwork Computation Sheets

Earthwork computation sheets, Form E-103 shall be used as a record and summary for the roadbed quantities and such other quantities as are included in the haul computations. The roadbed areas shall be noted directly on these sheets and the volumes computed therefrom. Other miscellaneous excavation which enters into the haul computations should be inserted at their proper places in the volume column with abbreviated identification.

The estimated shrinkage or swell factor to be used in the mass computations shall be approved by the Division Engineer. This factor shall be applied to embankment quantities except in the exceptional cases where the pay unit is for embankment measured in place. In such cases the factor will be applied to the excavation quantities.

The sheets shall be numbered and bound in booklet form.

Article 40—Location Mass Diagram

A mass diagram shall be platted on 10 x 10 cross-section paper using a 100-foot to the inch horizontal scale and a vertical scale such as will represent the mass of material to the best advantage. By breaking the diagram at the haul points, the vertical scale may be varied as desired.

Haul lines representing the limits of the designated hauls (free haul, short overhaul, long overhaul, etc.) shall be platted on the diagram and the limits scaled. The areas may be planimetered. If the areas are computed, the haul limits shall be scaled to the nearest foot.

Article 41—Profile

See Section 11, Article 12.

Article 42—Grade Lines

The grade line should be laid and balanced for a flat roadbed section of the width specified for the particular survey at hand. (See Sec. 11-11 for grade on structures.) The grade line established shall be for sub-grade and shall be so noted on all profiles.

Article 43—Comparison of Lines

When there are two or more lines to choose from, as is usually the case, the various physical quantities and the total cost shall be tabulated and summarized under appropriate headings on one sheet for all lines considered, so that the advantages or disadvantages of one line as compared with those of another may be seen at the same time.

Article 44—Projected Lines

When a suitable projection of a location has been made, an estimate of all the physical quantities involved on such line shall be made up in detail. In general these will include:

(a) Length in miles.
(b) Total rise and fall in feet.
(c) Maximum grade and total length of maximum grade.
(d) Total curvature and maximum curve.
(e) Number of maximum curves.
(f) Right of way in acreage.
(g) The various grading quantities.
(h) Total length of culverts of each size.
(i) Total length of trestles.
(j) Each large bridge as a unit.
(k) Masonry work, etc.
(l) Total cost.

In short, all quantities that can be ascertained and estimated, which will enter into the construction cost should be shown.

Article 45—Location Survey Records to be Submitted

On completion of a location survey the following records will be submitted to the Division Engineer for approval and forwarding to the Salem office.

Two copies of form "Locating Engineers Statement."

Detail map on hard paper, scale 100-foot to the inch for country or 50-foot to the inch for city and congested areas. The map will show all preliminary, located or projected lines, contours, streams, section lines, sub-division and property lines, buildings, roads, streets, railroads, telegraph, telephone and power lines, water, gas or electric conduits, sewers, vegetation, monuments, and any other pertinent details.

Profile, scale 100-foot horizontal and 10-foot vertical, on tracing cloth.

Detail map on hard paper, scale 400 feet to the inch. (When requested by the Construction Engineer. See Sec. 11-7.)

Cross-sections of located line on hard copy cross-section paper, scale 10 feet to the inch, ground inked and roadbed in pencil.

Mass diagram, pencil on hard copy profile paper.

Vicinity maps and profiles traced on cloth federal aid sheets, standard scale 50 feet to the inch. These are to be made for all retaining walls and for all stream, railroad and other crossings requiring structures larger than pipe culverts.

Vicinity maps on cloth of all new railroad crossings, scale 200 feet to the inch, to conform to P. U. C. standards.

Co-ordinate sheets, computation sheets, transit, level and cross-section notes.

Right of way descriptions for all property required on the location.

Report describing the survey, with comparison of lines run and estimates of costs.

This report is to be accompanied by a letter size sketch map showing the location of and giving a description of all buildings within the proposed right of way.

The body of the report shall cover in complete detail the conditions that make it necessary to hit such buildings.

Such other special maps and records as may be necessary or ordered by the Division Engineer.

Titles shall be placed on all records giving the name of the section and highway, the county, date and name of the locating engineer. On roll maps, profiles, etc., a sub-title shall be placed on the outside of each end of the roll. The main title will be on the inside of the left end of the roll. (See Section 11, Article 1.)

Article 46—Classification on Surveys

Where excavated material is classified on surveys otherwise than on a percentage basis, as by zones or sections, it must be clearly indicated on all sections to which it applies.

Article 47—Care of Instruments

Transit and levels are very expensive and delicate instruments and are easily damaged if not properly used and cared for. Locating or resident engineers will see that engineering instruments are issued for use only by employees who understand their use, and the proper methods for taking care of them.

Instruments shall not be left unguarded by day or left overnight in a building of such construction and location as to be safe from damage or theft. The person in charge of instruments shall exercise due care and judgment in leaving instruments and will be held responible when proper care and judgment are not used.

Form E-39-006-12-40

OREGON STATE HIGHWAY COMMISSION

AUTHORITY FOR SURVEY

Section *Madras - Terrebonne* Date *Janurary 6*, 19*38*

Highway *The Dalles - California* Authorization No. *1*

County *Jefferson* Survey Prefix ______ (Assigned by Salem office)

Description of termini, route, length, etc.:

The north end of the proposed survey is the intersection of 5th. and Oak streets in Madras, which is also the junction of the Warm Springs and The Dalles-California Highways.

The south end will connect with the Dalles-California Highway at the south city limits of Terrebonne.

Length - 21 miles.

Purpose of survey:

Make location, prepare plans, estimate of cost and right of way descriptions for proposed reconstruction.

Estimate of cost:

21 miles at $600.00 per mile - $12,600.00

INSTRUCTIONS

Submit three copies to Salem. After approval by the State Highway Engineer, one copy will be sent to the Division Engineer and one copy to the Resident Engineer.

This form does not constitute authority for making survey until approved and returned.

Submit separate order for each survey.

Total estimated cost of survey . . . . . $*12,600.00*

Previous authorization . . . .

Additional authorization requested . . . . .

Additional authorization approved (Salem) . . .

Total all authorizations approved (Salem) . . .

Request made by:

(s) J. M. Smith Field Engineer

Recommended for Approval:

(s) B.B. Black Division Engineer

Recommended for Approval:

______ Construction Engineer

Approved:

______ State Highway Engineer

STATE PRINTING

Form E-103-006-11-40

OREGON STATE HIGHWAY DEPARTMENT

Salem, Oregon

EARTH WORK COMPUTATION SHEET

Section *Bear Creek - Deer Creek* Line *Const.* Sheet No. *6*

Highway *Pacific* County *Douglas* Job No. *13-1082*

STATE PRINTING DEPT

STATION NUMBERS	AREAS Cut	AREAS Fill	VOLUMES Excavation	Excavation Subtotals	Embankment	Embankment Subtotals	MASS COMPUTATION Emb. + or − %	Summation	CLASSIFICATION Basis	Quantities Common	Inter	Rock
							1.0037781					
141	733.23							+17,443.5				
			1131.5									
+50	488.75							+18,575.0				
			698.6									
142	265.71							+19,273.6				
			524.3									
+50	300.55							+19,797.9				
			465.2									
143	201.85							+20,263.1				
			340.1									
+50	165.50	00						+20,603.2				
+75	Pyr. da.	Pyr.	51.1	3184.0	1281.8		1286.6					
144		2076.54						+19,367.7				
					5406.9		5427.3					
+50		3262.87						+13,940.4				
(+67.3)					2460.7 / 7105.4 / 4644.7	9144.4	7132.2	(+11,470.3)				
145		3911.00						+6,808.2				
(+47.2)					6782.4 / 7188.7 / 406.3	11,477.1	7215.9	(00)				
+50		3852.94						−407.7				
					7103.2		7130.0					
146		3818.63						−7,537.7				
					4329.5		4345.9					
+30		3974.43						−11,883.6				
					2385.1		2394.1					
+50		2665.25						−14,277.7				
(+84.2)					1878.1 / 2742.3 / 864.2	16,102.2	2752.7	(−16,163.0)				
147		496.43						−17,030.4				
		Wdg.			229.8	10940	230.7					
+25	00	00						−17,261.1				
	Wdg.		45.0									
+50	97.22							−17,216.1				
			3255.0		37,772.7		37,915.4					

LOCATING ENGINEER'S STATEMENT
Submit 2 copies with Estimate

Prefix 18-1466 Highway The Dalles- Calif.

Date 12/8/44 Section Chemult-Lobert Class Roadbed 150 M

1. Have you prepared and submitted the following report:
   (a) Locating Engineer's R/W Report yes
   (b) Report on Survey yes
   (c) Statement of source of materials and Stockpile sites no
   (d) Property and R/W descriptions yes
   (e) Statement of Information yes
   (f) Request for authority to open negotiations yes
   (g) Sketch map (tracing cloth) of all stockpile sites, gravel pits, quarries. no
   (h) Report of Bench Marks (See Circular Letter No. 192). no

2. Have you taken into consideration the mechanics and properties of the various types of soil encountered in designing the disposal of excavated materials, and the stability of embankment foundations? yes

3. Have all important alignment points been permanently referenced only along old hwy.

4. Have you consulted the Division Engineer with regard to retainment and abandonment of each fragmentary section of old Right of Way? yes

5. Do you anticipate any difficulty in securing rights of way no, Material Sources no and stockpile site no? Have you been over any of this project with R/W Rep? no. Report any knowledge you have regarding R/W negotiations? none to report

6. Are there any fences or mail box posts to be moved? If so, report in full, by station to station. no

7. Have you investigated drift conditions (snow and sand) and provided extra right of way and included drift fences in your estimate to take care of these conditions? yes

8. Have you submitted samples of the surfacing materials for test by the Salem Lab. for suitability? yes

9. Have you submitted a sample of the overburden to determine its classification for each material source specified? no

10. Will there be any difficulty in handling traffic during construction? If so, state control of work recommended, location of and maintenance of detours, public convenience and safety. no

11. Have you platted typical cross-section on the location profile of the following and indicated source of materials where needed.
    1. Roadbed grading yes
    2. Retaining walls none
    3. Irrigation Ditches none Special Drainage Ditches yes.
    4. Hand Placed Slopes none
    5. Rip Rap. Work none
    6. Tunnel (Drainage) none
    7. Channel Changes none
    8. Channel clearing and deepening none
    9. Sidewalks, curbs, gutters. none
    10. Flumes yes

12. Is there any slide condition apparent? If so, give location and recommended methods of control. no

13. Have you prepared vicinity maps and bridge construction, survey data sheets for each structure including bridges, concrete box culvert and any major siphon installation? yes

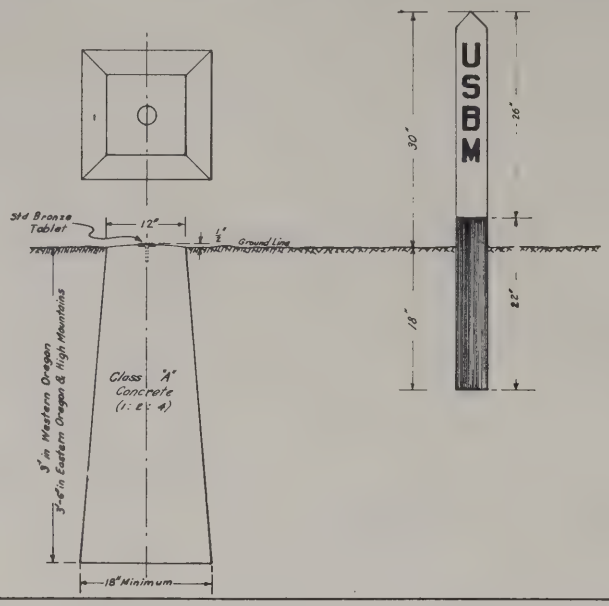
14. On projects involving reconstruction, have you shown, by a dotted line, the original ground line on the profile. yes

15. State standard used, sight distance provided, both horizontal and vertical, in accordance with Circular Letter No. 86 Std. of Dec. 31, 1940 used, all requirements of same conformed with.

Signed (s) J. Doe
Locating Engineer.

Address ______

STANDARD CONCRETE MONUMENT & BENCH MARK GUARD POST



REPORT ON BENCH MARK RECOVERIES

Highway Followed John Day Level Line 135

County Grant Date 3/6/45 Eng'r. J. Smith

(Report only one level line on a sheet and submit in duplicate)

No.	Found		Condition				Reset		Marker in Place			Description OK		Remarks
	Yes	No	Good	Disturbed	Inaccessible	Destroyed	Yes	No	Yes	No	Needed	Yes	No	
A 135	✓		✓						✓			✓		
B 135		✓												
C 135	✓					✓	✓		✓					See attached form E 185
D 135	✓		✓						✓				✓	See attached form # E 186
E 135	✓		✓							✓	✓	✓		

Note: This form to be used in reporting bench mark recoveries where existing descriptions are satisfactory. Use the standard "Report on Condition of Bench Mark" cards only when changes in the description are sufficient to warrant their being sent to the Government Bureaus.

Submit both notes and descriptions for all new marks.

Form E-185—1M—2-41

OREGON STATE HIGHWAY COMMISSION

DESCRIPTION OF BENCH MARK

Designation of bench mark V 274 (OSHD) State Oregon County Tillamook

Nearest town Tillamook County Tillamook

Distance and direction from nearest town 4.35 South

Detailed description of location

About 4.35 miles south of Tillamook on Oregon Coast Highway, about 100 feet west of entrance to South Prairie School, 40 feet north of highway, 2 feet east of west fence of school yard. Disk stamped "V 274 1940" in concrete post.

Character of the mark Standard O.S.H.D. bronze disk

Established by what organization Oregon State Highway Department

Chief of party Tom B. Slack, Res. Engr. Date Aug. 14, 1944

STATE PRINTING DEPT.

Form E-186—1M—2-41

OREGON STATE HIGHWAY COMMISSION

R

REPORT ON CONDITION OF BENCH MARK

Designation of mark D 135 (U.S.C.&G.S.) State Oregon County Jackson

Nearest town Merrywale Distance and direction from nearest town 14.3 S.W.

Mark searched for or recovered by—(Name) A.B. Ball

Date May 6, 1944 (Occupation) Resident Engineer

(Address) Merrywale, Ore.

Present condition of the mark Good

Letters or numbers found stamped on (not cast in) the mark D 135, 1934

Use the following space for reporting upon the thoroughness of the search in case mark was not recovered, or for suggesting needed changes in the published description, if the mark was recovered

Description OK. as given on page 316 in S.P. 177 except that distance to Merrywale has been reduced and description should read as follows; "About 14.3 miles southwest of Merrywale on Pacific Hwy, 0.5 mile northeast of summit, 30 feet southeast of road. U.S.C.&G.S. disk in concrete post."

STATE PRINTING

(Signed) (s) A.B. Ball

Form E-273—1M—11-46

OREGON STATE HIGHWAY COMMISSION

BRIDGE CONSTRUCTION—SURVEY DATA

For bridge over ..... Bridge No. :.....

Located ..... (Distance) miles ..... (Direction) from ..... (Nearest R. R. Station)

in section ..... (or between sections .....), twp. ....., range .....

County of ..... Name and number of road .....

Local name of bridge ..... Date of report ..... Report by ..... (Engineer)

(A) MATERIALS SURVEY

MATERIAL	Source of Supply	Haul to Site (Distance and Character of Road)	Estimated Cost (F. O. B. Site)
(1) Cement			
(2) Fine aggregate			
(3) Gravel for coarse aggregate			
(4) Crushed stone for coarse aggregate			
(5) Structural timber			
(6) Falsework timber			
(7) Piling			

(8) Other materials data .....

(B) WATERWAY SURVEY

(1) Location and elevation of bench mark and datum used .....

(2) Drainage area in acres ..... Character of watershed .....

(3) Width, depth and cross-section of stream: (1) of flood stage .....
(Show by sketches if necessary) (2) at low water stage .....
(3) at ordinary stage .....

(4) Elevations (a) Lowest point in stream bed at bridge site ..... (b) Highest water .....
(c) Lowest water ..... (d) Highest ice ..... (e) Highest drift .....

(5) Frequency and duration of floods ..... Season of year .....

(6) Extent of drainage to be feared from ice or drift .....

(7) Will all flood water pass through new structure or will relief be afforded through highwater channels or over approach fills? (Illustrate by sketch) .....

(8) Is stream in general cutting or silting up and at what rate? .....

(9) Is there any tendency for stream to shift laterally or to change its channel? .....

(10) Is there need of any of the following work in connection with construction of new bridge?
(a) Channel changes .....
(b) Enlargement or clearing of channel to afford more waterway .....
(c) Bank protection, revetments, wingdams, etc. .....
(Illustrate by sketches)

STATE PRINTING

(11) Location of nearest existing structure over same waterway .....
give following data for this structure:
(a) Number and length of spans and approaches .....
(b) Waterway area produced by old structure .....
(c) Is this area too small? ..... Is it too large? .....
(d) Is there any indication of erosion around piers or abutments, of damage from ice or drift or of damage due to inadequate clearances of inadequate span lengths? .....
(e) What is the elevation of the clearance line on this structure referred to same datum as used above .....

(C) FOUNDATION SURVEY

(1) Character of material composing stream bed and banks .....

(2) Character of foundation material (give all data from soundings or borings) .....

(3) Distance from stream bed to solid foundation material .....

(4) If piling have been driven into these strata at any point near at hand, furnish following data: (a) Character of driving ..... (b) Depth of penetration .....

(5) What type of foundations have been used on structure near by .....

(D) GENERAL DATA AND RECOMMENDATIONS FOR NEW WORK

(1) Total recommended length for structure and approaches, from sta. ..... to sta. .....
or ..... feet.

(2) Number and length of spans recommended .....

(3) Can any of the approach structures recommended above be filled should the same prove economical? .....
If so, between what stations .....

(4) Type of structure recommended .....

(5) Width of roadway and number and width of sidewalks .....

(6) Recommended grade line (show by sketch) .....

(7) What is approximate cost of approach filling material per c. y. at this site? .....

(8) Will temporary bridge be needed or can traffic be detoured? .....

(9) Recommended clearance for superstructure to permit passage of logs or drifts, etc. .....
Elevation .....

(10) Are there any special conditions controlling the following:
(a) The spacing of any one or more piers .....
(b) The length or vertical clearance of any one or more spans .....
(c) The length or angles recommended for any special wingfall construction .....
(d) The depth of any one or more footings .....

(11) Are there any other special features to provide for? .....

If the structure contemplated involves a grade separation with an existing railway or a crossing of a navigable waterway, special information must be furnished to cover same. Blank forms covering the specific data needed in this connection will be mailed upon request. Accompanying the above report should be submitted a map of the site on a sheet 22 x 34 inches, giving the data covered in circular letter dated March 14, 1925, in reference to vicinity maps. (Copies of this circular will be furnished upon request.)

SECTION 6. CONSTRUCTION SURVEYS

Article

1. Retracing Lines.
2. Referencing Lines.
3. Clearing Stakes.
4. Grade and Slope Stakes.
5. Cross Section Reference Readings.
6. Cut and Fill Slopes.
7. Slope Stakes to be Placed Normal to Center Line.
8. Marking Slope Stakes.
9. Superelevated Sections.
10. Finish Grades.
11. Final Grading Cross Sections.
12. Final Grading Cross Section Computations.
13. Calculation of Cross Sections by I. B. M. Machines.
14. Measure Large Boulders.
15. Revisions During Construction.
16. Stockpile Cross Sections.
17. Final Construction Mass Diagram.
18. Service Drives.

Article 1—Retracing Lines

Upon being assigned to a construction project, the Resident Engineer shall immediately retrace the located line, restablishing portions that have become disturbed or obliterated.

Article 2—Referencing Lines

Particular attention should then be given to referencing all points necessary. These will include all curve and spiral points, points of intersection of tangents, all points on tangent set in location and enough other points to enable him to reestablish quickly any portion of the line, bearing in mind that construction operations will interfere with the reestablishment of line during construction. He shall see that all reference points are placed where they are not likely to be disturbed during construction. Accurate measurements from the point referenced to the reference hubs should be recorded so that if one reference is destroyed, the point may still be reestablished. If errors are found in the location survey, the work should be checked until the engineer is satisfied that an error exists and its location and amount known. At the point where the discrepancy is found, an equation shall be made and the location stationing carried forward as originally staked. This must be done in order that construction records shall agree as closely as possible to the location survey, as all right of way descriptions are based on the location survey. (See Section 7, "Field Notes" for examples of references.)

When it is found that any section, subdivision, county survey corner, city monument, or other property corner is to be destroyed or buried by reason of the highway construction, each corner shall be adequately referenced, the reference points to be at least as permanent as the corner destroyed or buried. Notes of all such references shall be furnished the County Surveyor or City Engineer for filing and recording. All such references shall be shown on the final construction map.

Article 3—Clearing Stakes

After referencing clearing stakes marking the outside limits of clearing shall be set over the entire project.

Article 4—Grade and Slope Stakes

As soon as the contractor or his representative appears on the project, the Resident Engineer shall confer with him and ascertain where he expects to start work and the general plan of procedure. The Resident Engineer will then arrange to have construction cross section stakes set and kept well in advance of the grading. However, they should be set only after the clearing has progressed to a point where the stakes will not be disturbed by the clearing operations.

Cross sections will be taken at intervals of not more than fifty feet, except in very uniform country where they may be taken at longer intervals, but not to exceed one hundred feet. They shall be taken at all breaks in the original ground surface at the points on centerline and edge of roadbed where the profile grade intersects the ground surface. At the latter points grade hubs shall be set to the nearest tenth of a foot. Grade hubs shall also be set on cut and fill sections where the ground line intersects the profile grade.

Article 5—Cross-section Reference Readings

On all steep side hill work or where the engineer may anticipate slides, readings should be taken beyond the slope stakes for a distance at least equal to the depth of cut. The limit of these extended readings should be marked by a stake, giving the station and distance so that they may be used in re-measurement.

These extended readings should be shown on the platted cross sections and re-measurement platted to the full distance taken.

In cuts where normal conditions may be expected, it is good practice to set reference stakes a uniform distance of ten feet back on the cut stakes. Reference stakes should be marked with the cut, in reference to the profile grade, and with the distance from centerline, and should be set with the station marked side facing centerline.

Reference cut stakes provide a ready means of resetting cut stakes that may be destroyed during construction and are valuable as a check when re-measuring excavation quantities.

Article 6—Cut and Fill Slopes

Refer to Section 10, "Design" for slopes to be used under various conditions.

Article 7—Slope Stakes to be Placed Normal to Centerline

In heavy work on steep hillsides, special care must be taken that the slope stakes are set at right angles to the centerline. The use of some simple instrument which will insure a correct right angle for the section is urged.

Article 8—Marking Slope Stakes

Cross section slope stakes shall have the cut or fill and the distance from the centerline marked on the roadway face of the stake thus: $\frac{C3.0}{15.0}$ or $\frac{F3.0}{16.5}$, and these readings will refer to top of a guinea set in front of the slope stake. The station and plus where the section is taken shall be marked on the back of the stake.

Each grade point on centerline, at edge of roadbed or at grade on cut and fill section, shall have a stake placed at the back side of the grade hub and be marked thus: $\frac{00}{12.0}$, the bottom figure being distance out from center, with stationing shown on the back side of the stake. (See Section 7, Article 8.)

Article 9—Superelevated Sections

Superelevated sections shall be cross-sectioned in the manner indicated in the section "Design Standards" where the raising or lowering from profile grade is indicated.

Article 10—Finish Grades

For the final grading operationg blue-topped grade stakes shall be set on the subgrade at intervals of not more than 50 feet, to provide a means for the contractor to complete grading operations. These shall be set to within two-hundredths of a foot from the grade elevation indicated on the profile.

On paving work grade stakes shall be placed at a distance not to exceed three feet from the edge of the pavement, preferably about one foot. A tack shall be placed in the top of the grade stake to designate line. Marking grade stakes with lines for elevation will not be permitted. Grade stakes shall be driven to the nearest hundredth of a foot. After the forms for the paving are set, they shall be checked to see that they are true to grade; irregularities shall be marked on the side of the forms for correction by the form setting crew. Following the final alignment of the forms, they shall again be checked to see that the corrections have been properly made.

Article 11—Final Grading Cross Sections

Platted cross sections need not be submitted for grading jobs that involve simple sections where the cross section and remeasure notes have been recorded in the manner set forth in Section 7, Article 8, so that the areas and quantities can be computed directly from the notes.

Where it is necessary to plat the cross sections, they shall be platted upon 10 x 10 cross section paper eleven inches wide, fourteen inches long. The scale shall be ten feet to the inch except in special cases, where the change will be clearly indicated. These pages shall be numbered and bound into a book. Onion skin federal aid size sheets are not to be used for platting final cross sections. Superelevation shall be shown to scale.

Each page shall have a title in addition to the main title on the cover page; the title on the inside pages need only be sufficient to identify any page which might temporarily become displaced during checking operations at the Salem office.

In cases where sub-contractors are doing part of the work, a split must be made in the sections at the occurrence of the work so that the sub-contractor's estimate may be taken out by the contractor.

Trench and structural excavation may be computed directly from the notebook and need not be platted.

Article 12—Final Cross Section Computations

On final construction records all cross section areas shall be computed to the nearest hundredth of a square foot. Yardage shall be computed by the average end area method to the nearest tenth of a cubic yard, except that where pyramids occur at the end sections or cuts or fills, their yardage shall be computed as pyramids.

Cross section quantities must be computed as rapidly as the cross sectioning progresses from day to day, in order that comparison can be made with the preliminary and location quantities and a check made against the assumed swell or shrinkage factors used in the preliminary estimate.

The quantities shall be carefully checked and rechecked before being accepted as correct. In case an unusually large difference develops between the location and construction quantities, re-examine both sets of level and cross section notes to find out where and why the difference occurs.

On the more costly material such as concrete, rubber masonry, etc., the prismoidal formula or other accurate methods of computing volumes shall be used.

Article 13—Calculation of Cross Sections by I. B. M. Machine

The method of computing cross sections by I. B. M. machine will be the method used henceforth in computing roadbed areas and volumes.

The following instructions are offered as a guide in preparing the notes, and use of the new note sheets:

1. Keep the carbon copy, send in original to Checking Department, Salem. The original will be returned to you in a few days, as soon as the data is punched into the I. B. M. cards.
2. *Note:* Center line reading and station No. appear on both left and right hand sheets.
3. Indentify all (00)s. Catch them in the field preferably, but get them all. Outline each area with connection lines or arrows. (See typical notes)
4. Enter reading (elevation and distance) in windows with + or — before each elevation reading. Write legibly and as large as the window will allow. *Note to office man,* look over notes to see that they are legible and that all the (00)s are caught.
5. Identify each area with the letter C or F for cut and fill. This may be done in the margin above a set of windows. Slope stake reading may also go in the margins.
6. Be sure to show tenths in all elevation and distance readings. Thus the number ten is written 10^0 and the number one, 1^0. Never leave the zero decimal out. To do so may result in a 10 (ten) being punched into the I. B. M. card as 1^0, a 1 (one) being punched as 0^1, etc.
7. Do not pyramid any areas. Wedge them all. Most pyramided areas are small and will not introduce a large error if wedged. However, where it appears the error will be large, take ⅔ of the pyramid dist. and and note it as a wedge.
8. Unless the error introduced is large, wedge all areas to the next station being cross-sectioned.
9. In scratch jobs where separate areas of the same kind (cut or fill) appear at the same station and would wedge for different distances, wedge all to an average distance. This is necessary, as otherwise time consuming interpolations would be necessary to process through I. B. M. machines.
10. It is not necessary to wait until the entire job is cross-sectioned before sending in notes for computation. It may be preferable to send in sections of the job as they are taken.
11. After the data are processed through the I. B. M., summary sheets (similar to the "Earthwork Computation Sheets" now used) will be printed with carbons, two will be returned to the Resident Engineer to be used as work sheets. On these he may enter his mass computations and make such necessary corrections as occur during the process of construction. At the completion of the job, one set should be corrected to show the final quantities and submitted with final records.
12. There is a possibility that errors will occur in this system due to misinterpretation and erroneous punching of the data into the control cards. It is believed that the majority of these will be of little or no consequence and may be ignored, but every engineer, upon receiving his summary sheets, should scan the areas and volumes closely to see that no large errors have been made. With his knowledge of the job, any errors of consequence can be picked out by comparison with adjacent sections.

Article 14—Measure Large Boulders

Large boulders should be measured and recorded as they lay above the natural ground.

Article 15—Revisions During Construction

When changes appear advisable in grade or alignment during construction, complete sketches shall be prepared showing the original line and the proposed change. Accompanying the proposed plans shall be a statement showing the original quantities and cost and the revised quantities and cost. This information is to be submitted to the Division Engineer for his approval before the change is made (and if approved by him to be transmitted to Salem headquarters).

Article 16—Stockpile Cross Sections

Greater care should be exercised in cross sectioning stockpiles than in cross sectioning roadbed quantities on account of the relatively higher cost of this material, attention being given to minor breaks in the ground line and in the lines of the finished pile.

The average end area method of computing volumes is sufficiently accurate and shall be used for the main body of the pile, but for the end sections which flare out to form a wedge and two pyramids, a method giving greater accuracy should be used. A good formula to use for these end sections is $\frac{(W + W_1 + W_2)Lh}{162} =$ Cu. Yds., in which W is the width of the oo section where the end of the pile meets the original ground, W_1 and W_2 are the top and bottom width respectively of the section at the peak of the wedge and two pyramids, L is the horizontal distance between the oo section and the peak section, and h is the average height of the peak section. h is obtained by dividing the area of the peak section by $\frac{W_1 + W_2}{2}$ and should be carried to the nearest .01 of a foot.

The cross sections should be taken and recorded as shown in the sample notes, Section 7, and the areas and volumes computed directly from the notes. Platted sections are not required and should not be submitted if the notes are so recorded.

Article 17—Final Construction Mass Diagram

The mass ordinates shall be computed to the tenth of a cubic yard. The haul limits shall be computed to the tenth of a foot. Do not go beyond these limits.

The quantities shall be computed, not planimetered.

The construction mass diagram shall be in ink.

Article 18—Service Drives

The highway commission recognizes the right of access to existing highways by abutting property owners conditioned upon such access being in conformance with the regulations, design, specifications, and stipulations as set forth herein. Exceptions to the foregoing are as follows:

(a) Where the right of access has been transferred to the State.

(b) At those locations wherein sight distance may be impaired or for any reason the service driveway constitutes a traffic hazard.

(c) Where unnecessary damage to roadside trees and landscaping would result.

There are certain basic dimensional controls, specifications, and regulations which must be complied with and which will be found applicable to the majority of conditions encountered. The specific controls are enumerated hereinafter and general reference is directed to the several typical sketches included herewith.

Dimensions—

1. The parking of cars on the right of way for service or for the transaction of business in connection with the commercial activities abutting upon the highway shall be prohibited. Gas pumps, roadside stands, and structures of similar nature shall be maintained at a minimum 10-foot setback from right of way line.
2. Single service driveways shall be limited to a maximum 25-foot width measured parallel to the highway center line. In cases where there are "entrance and exit" service drives, the normal width of each shall be 25 feet with the safety island between the two driveways a minimum of 20 feet in length. In the instance of dual access drives, additional width thereof, over and above the specified 25 feet, will be permitted in amount equal to one-half the extra island length (over and above the minimum 20 feet) up to a maximum of 30 feet for each driveway.
3. If additional setback is provided over and above the minimum 10 feet, additional width driveways will be permitted equal to one-half of such addi-

tional setback but not to exceed a maximum of 30 feet for any one driveway.

4. The 10-foot minimum setback requirement shall not be retroactive or applicable in the instance of existing gas pumps, stands, etc., installed prior to January, 1939. In such cases improvements and alterations will be allowed up to 25 per cent of the present appraised value of the business establishment after which it will be placed in the category of a new structure and the 10-foot setback regulation will apply. If the present structure burns or is otherwise destroyed, any new development shall be governed by the regulations set down herein.
5. In the instance of single driveways, the "curb return" radius shall be confined to 10-foot minimum and 15-foot maximum. In the instance of dual entrance driveways, the inside radius shall be 10-foot minimum and the outside radius variable up to 25 feet maximum.
6. In the instance of single driveways on each of two intersecting streets or highways, the minimum and maximum radii shall be the same as in the case of dual driveways. In the instance of an establishment at or near an intersection, a minimum distance of 30 feet shall be maintained between the intersection of right of way lines and the near edge of any service drive. (Refer sketches 1, 2, and 3.) In no case shall driveway aprons extend around the corner of an intersection nor shall the corner be used at all for a drive area.
7. Wherever possible, service drives shall be so constructed as to allow the motor vehicle to come to a full stop on practically level ground before entering upon the highway. In no case shall the grade of the service drive exceed 20 percent for the first 20 feet of driveway immediately adjacent to the highway shoulder.

Drainage—

1. Culverts shall be installed under the service drive of end area such as will provide adequate drainage. In any case such culverts shall be a minimum of 12" diameter pipe. Only standard (tongue and groove joint) concrete or corrugated iron culverts will be permitted. Tile or wood box culverts shall not be permitted. Temporary plank bridges shall be permitted only by special permit and for a limited period.
2. Whenever a bridge or drainage structure other than a culvert pipe is involved, special approval of the Highway Engineer will be required, and a special agreement covering the construction and maintenance of the installation will be drawn up.
3. When long lengths of pipe are installed, catch basins may be required, at the discretion of the Engineer, to collect and carry away surface water.
4. The grade of all driveways shall be such that no water is thrown onto the highway pavement or shoulder. The normal shoulder slope away from the highway pavement shall be maintained for the full width of the shoulder and on the upper side of a super-elevated curve a shallow valley shall be formed at the edge of the shoulder to divert water from the highway pavement.

Grading and Surfacing—

1. Rocking or surfacing shall be limited to the area of the service drive proper, and those areas not in the service drive are to be improved by sidewalks, curbs, lawn, or shrubs.
2. For service drives projected through a highway cut, the cut shall be rounded back such as to afford the maximum unimpaired sight distance to the vehicle operator entering upon the highway.

The Engineer will perform the necessary field work in the establishment of grade lines and the general layout of the service drives.

In the instance of service drives in rural areas, the property owner will furnish the culvert in cases where 18" pipe is adequate. In cases where larger than 18" pipe is required, the State will furnish the pipe but only on receipt from the owner of an amount equal to the purchase price of the standard 18" pipe. In cases where catch basins are required, the owner shall furnish the cast iron grate and frame and the State will construct the concrete box.

In cities where curbs are in place, the property owner will pay all costs of the service drive construction. The construction must conform to lines and grades established by the Engineer.

Pipe installation; the driveway embankment; the surfacing of the driveways (on the right of way), and the construction of safety islands will be performed by the State. In the instance of driveways where no pipe is required, the State will place the embankment and surfacing and build the island. Where catch basins are required, the State will construct the concrete

box, with the property owner to furnish the cast iron grate and frame as indicated hereinabove.

On all service drive construction involving pedestrian safety islands, landscape developments or extra width driveways, including commercial or service station entrances, the State's cooperation shall be limited to such culvert pipe, embankment, and surfacing as are required for normal width driveways only.

In the instance of large-scale business or commercial developments requiring special treatment and where extra width drives or other special conditions prevail, special approval by the Highway Engineer will be required, and it will be necessary to submit to him a plan of the proposed access facilities. When more elaborate facilities are required, the State will install all culvert pipe, construct all catch basins, and provide such embankment materials only to the extent of that which would be required for normal width service drives and to the extent of the State's cooperation in connection with such normal width drives as set down hereinbefore. Such additional material or work as may be required over and above that necessary for normal width driveways shall be performed at the expense of the property owner.

As regards maintenance, the Highway Department will maintain service drives in rural areas, constructed in compliance with Department regulations, which lie within the highway right of way. In cities, that portion of service drives and any drainage structures incident thereto which lie within the highway right of way will be maintained by the Highway Department except as otherwise provided in agreements covering a particular development.

Service drives constructed by private parties contrary to Highway Department regulations are subject to removal and shall not be replaced or maintained.

The State Highway Commission is not obligated to build driveways and reserves the right to refuse cooperation in instances requiring expensive construction. When cooperation in service driveway construction is estimated at a cost in excess of $75.00, special approval by the Highway Engineer will be required. Whenever a drainage structure other than culvert pipe is involved, special approval by the Highway Engineer will be required.

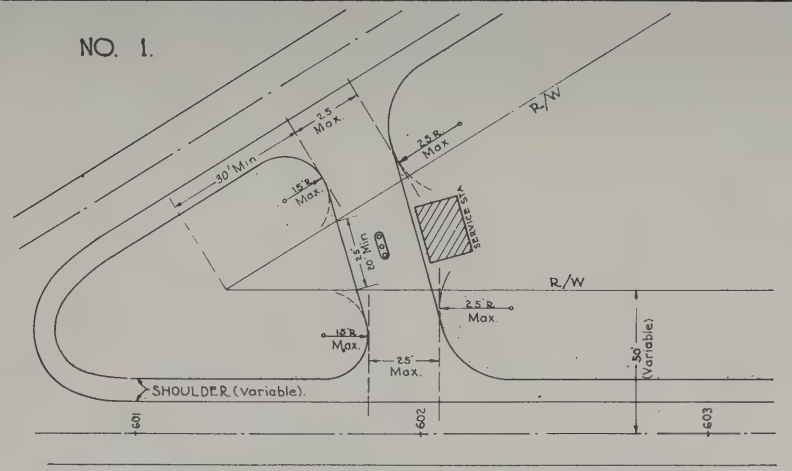
Whenever any new driveway on an existing highway or any modification or extension of an existing driveway is requested, the District Maintenance Superintendent should contact the property owner, ascertain that the State has not purchased access rights, inspect the proposed entrance as to the hazard and cost, and explain the requirements to be met and the conditions of State Highway cooperation to him.

For entrance in cities, and those requiring bridge construction, or commercial or landscape developments, involving extra-width driveways and pedestrian safety islands, a sketch of the proposed development, together wtih an estimate of cost, should be prepared and submitted for the Engineer's approval.

If the property owner agrees to the terms and conditions imposed, authority to proceed with the State's portion of the work should be requested in the form of a betterment order sent through proper channels to the office of the Maintenance Engineer, unless already provided for in the budget.

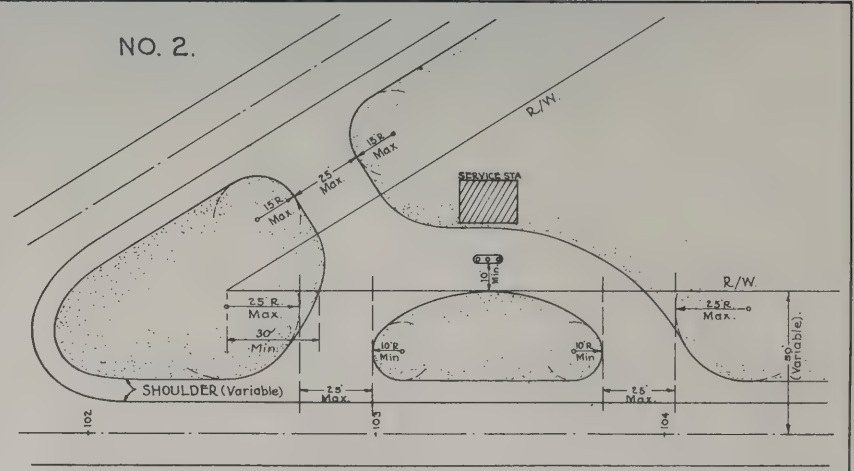
The above procedure has reference solely to installations and modifications on *existing highways.* Wherever *new highways* are built or old highways are relocated, the total cost of entrances, including all necessary culvert pipe or bridges, will be borne by the State as a part of the right of way cost.

NO. 1.



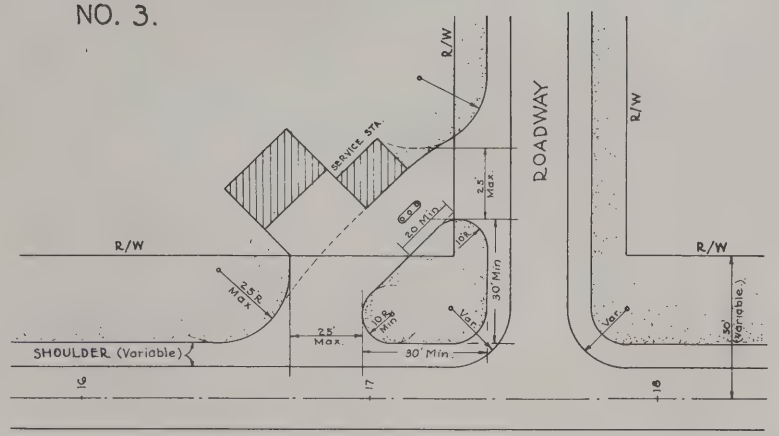
TYPICAL ENTRANCE DRIVE

NO. 2.



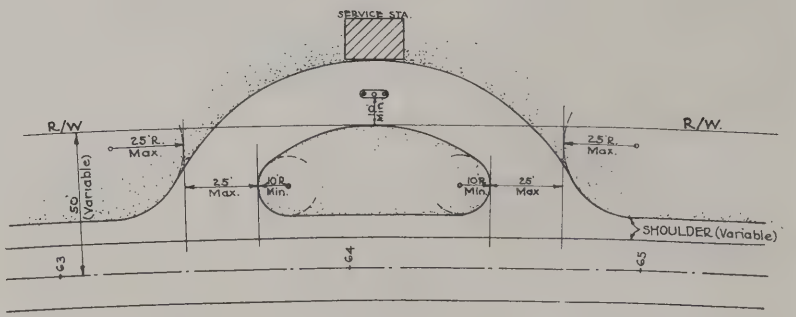
TYPICAL ENTRANCE DRIVE.

NO. 3.



TYPICAL ENTRANCE DRIVE

NO. 4.



TYPICAL ENTRANCE DRIVE

Ground Elev. | Grade Elev. | Station

_____ Line Date _____ Party _____

Project _____

Oregon State Highway Department

Cross Sections LEFT

Oregon State Highway Department

Cross Sections RIGHT

Project _____

Station

C

Typical

C

Notes

Ground Elev.	Grade Elev.	Station		R.P. f 23°		1½:1 f 22°	F		(00)	C	
60.9	51.3	162+00	-22.6			-22.5	-19.7	-10.9	+0.2	+3.3	+9.6
			82°			65.8	48.5	35°	20.8	14.8	0
								+0.4		0.0	-1.0
								31.5		11°	0

			C			1:1 C 32.3		R.P. C.35.5			
			+9.5	+16.5	+26.1	+29.4			+32.6		
			0	16°	41°	53.3			68°		
			-1.0	-2.9							
			0	21°							

162+00

Ground Elev.	Grade Elev.	Station	1:1 C 13.7		C		(00)		C		
39.6	29.8	181+50	+20.8	+17.3	+9.3	+7.3	+7.1	+7.8	+8.4	+9.5	+9.8
			71.7	43°	38°	35.2	34°	29°	23.2	12.7	0
						+7.1	+7.1		-0.2	00	+0.2
						58°	34°		21°	11°	0

			C		(00)	F	1½:1 f 3°		R.P.		
			+9.8	+2.8	-0.1	-2.2	-3.2		-6.9		
			0	8.2	15.5	23°	26°		42°		
			+0.2	0°		-0.2		Wedge Cuts			
			0	11°		21.5		To	181	+42	

181+50

Corrected 7-13-53

SECTION 7. FIELD NOTES

Article

1. Responsibility for Accuracy of Notes.
2. Index all Notebooks.
3. Keep Separate Notebook for Each Job.
4. All Items to be Accompanied by Notes.
5. General Instructions for Keeping Notes.
6. Notes Covering Monuments and Markers to be Separate.
7. Cross Section Notes; Location.
8. Cross Section Notes; Construction.
9. Sample of Preliminary Line Transit Notes.
Sample of Location Transit Notes.
Sample of Level Notes.
Sample Location Cross Section Notes.
Sample of Construction Cross Section Notes.
Sample Stockpile Cross Section Notes.
Sample Culvert Notes.
Sample Topography Sheet.

FIELD NOTES

Article 1—Responsibility for the Accuracy of Notes

The Resident Engineer shall be held strictly responsible for the care and accuracy of all field notes.

Article 2—Index all Notebooks

All notebooks shall have an index in the front of each book.

Article 3—Keep Separate Notebook for Each Job

Where a Resident Engineer looks after work covered by two or more contracts, he shall have separate notebooks kept for the work covered by each contract.

Article 4—All Items to be Accompanied by Notes

All items appearing on the final estimate shall be supported by notes taken in the field.

Article 5—General Instructions for Keeping Notes

Field notes will comprise all preliminary, location, vicinity and construction notes in book form on alignment, levels, topography and cross-sections pertaining to the work. These shall all be turned in to the Division office upon completion of the job. Before doing so, the Resident Engineer shall see that all notes originating under his jurisdiction are properly prepared and indexed. They must be so arranged and titled that they can be readily identified and distinguished from the preliminary or subsequent location and construction notes. Each book shall be titled showing the name of department, highway, county, section or job, and name of Resident Engineer, and also the year and dates of the survey.

Be sure that all pages of notes are numbered consecutively. This is especially important where the loose-leaf type is used. Also be sure that the names of the party making the survey are shown along with their respective positions on the party.

Before the notes are turned in the Resident Engineer shall prepare a complete list or index in duplicate of all records and notes. When checked, he should retain the duplicate and turn in the original with all records to the Division Engineer's office.

The date and state of weather shall be entered on the pages used in keeping notes each day.

Care must be taken that the notes are neat, clear and above all accurate.

No notes of any kind shall ever be erased or destroyed. If it so happens that any notes taken are to be voided, they are to be crossed out by drawing diagonal lines across the page and writing "void" across it in such a manner that the notes will still be legible.

Article 6—Notes Covering Monuments and Markers to be Separate

Notes covering any moving, re-setting or referencing of monuments must be sent to the Salem office through the Division Engineer, accompanied by a letter of explanation. Notes covering monuments must not be incorporated in the regular project notes. Descriptions should be full. Approximate true directions should be used and not such expressions as "left of station" or "right of station." Important landmarks should be mentioned. Level notes need only show the turns and the bench mark information. (See Sec. 5, Art. 30.)

Article 7—Cross-section Notes; Location

Form E-34 (level sheets) shall be used in recording cross-section notes for location surveys. Actual readings shall be entered and not angle of slope.

Article 8—Cross-section Notes; Construction

All cross-section readings shall be taken plus (+) or minus (—) from profile grade, the + or — sign preceding the reading in the notes. Elevations shall not be used. The cut (C) or fill (F) reading marked on the slope stakes (see Sec. 6, Art. 8) is the distance above or below the base of the slope (the edge of the

roadbed, bottom of ditch, etc.) and the notes for this reading should show the plus (+) or minus (—) reading from profile grade and in parenthesis above, the cut (C) or fill (F) reading from the base of the slope.

The original ground notes shall be noted on every fourth space in the cross section notes and immediately underneath these original ground notes shall be placed the original design notes, i. e., the notes which designate the width of roadbed, the superelevation, side ditches, etc., to which the section is to be graded. If other remeaseure notes are necessary, as in rock cuts, slide sections, etc., they shall also be placed immediately underneath the original ground notes on the line with the original design notes. If it is necessary or desirable to take slope measurements in remeasuring, record these on a separate sheet and transfer the plus or minus vertical and horizontal distances as computed to the original cross section sheets.

After the profile grade has been established and the original ground sections taken, do not change this grade elevation or these ground notes to take care of minor grade changes. Make corrections in the original design notes to show the alteration in the grade.

If interpolated sections are necessary at stations where no original ground line was taken, do not try to sandwich these notes in between the original ground sections taken previously but put them on separate sheets with notations in the original ground notes as "see sheet — for interpolated sections".

Do not wait until sections are platted to compute the neat section areas and volumes. Compute the areas from the notes immediately after the original ground cross sections are taken and note them on the computation sheets. As soon as the volumes are computed, comparison should be made with the preliminary estimate and the monthly estimates based upon the final measurements.

Cross sections for stockpiled material, borrow pits, etc., should be taken and recorded in a similar manner—plus or minus from a well-established datum point or line. When so taken, the areas and volumes can be computed directly from the notes and the sections need not be platted. (See Sec. 6, Art 11.)

Superelevation figures to be used in cross sectioning shall be secured from the "Roadbed Design Standards" which are included in this book under the heading of "Design".

SAMPLE TRANSIT NOTES - "P" LINE

(26) "P" LINE DATE 4/25/45 PARTY Tompkins - T, Olsen - HG, Collins - Ch., Kelly - Stakes, Lodd - Axe.

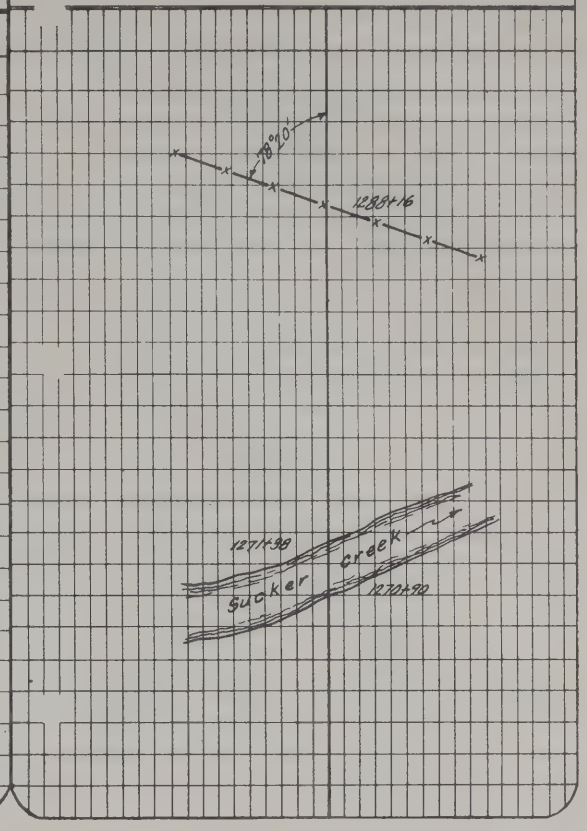
PROJECT Bear Creek - Deer Creek

Form 58-A—10M—1-37

Cloudy

TRANSIT SHEETS (26)

Sta.	Dist.	+ Lt.	+ Rt.	Calc. Course	Mag. Bearing
				S41°39'W	S41°52'W
			(2) 187°13'		
Δ1290+24.58			(1) 15°36'		
			15°36'05"		
	449.33			S26°12'55"W	S26°09'W
		(2) 18°00'			
Δ1285+75.25		(1) 1°30'			
		1°30'00"			
	500.00			S27°42'55"W	S27°51'W
			(2) 36°00'		
Δ1280+75.25			(1) 3°00'		
			3°00'00"		
	462.14				
⊙1276+13.11				S24°42'55"W	S24°40'W
	597.91				
			(2) 97°23'		
Δ1270+15.20			(1) 8°07'		
			8°06'55"		
				S16°36'W	S16°45'W



SAMPLE TRANSIT NOTES - "L" LINE

(12) "L" LINE DATE 3/7/45 PARTY Lamb - T, Coker - HG, Britt - Ch., Waltz - Stakes

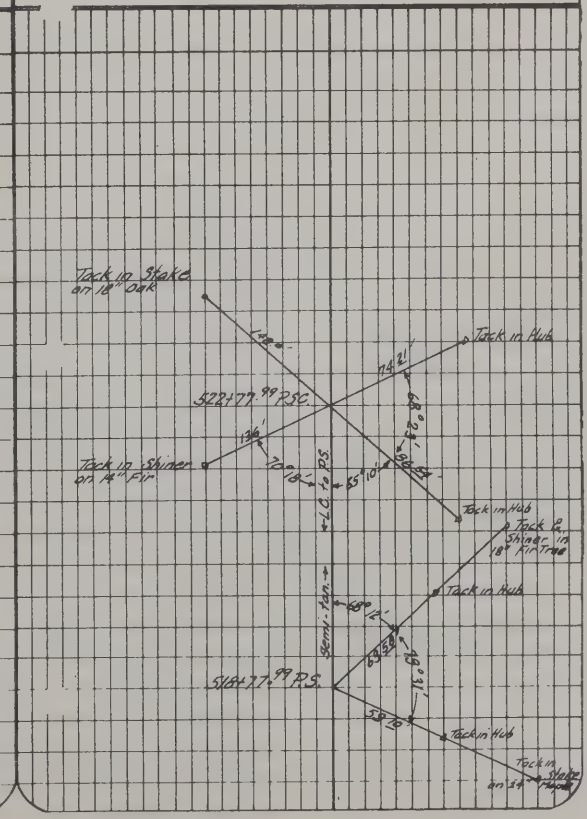
PROJECT Cascade Locks - Vienta

Form 58-A—10M—1-37

Rain

TRANSIT SHEETS (12)

Sta.		Def'n.		Curve Data
527		4°13'		
+50		3°43'		2°00' CL.
526		3°13'		TA 22°34'
+50		2°43'		Ts 772.01
525		2°13'		R 2864.79
+50		1°43'		LMC 728.33
524		1°13'		
+50		0°43'		Ls=400
523		0°13'		3-4°00'
522+77.99	P.S.C.	0°00' / 1°20'	0°00'	a= 0.5
+50		1°09'	0°16'	x= 9.30
522		0°52'	0°44'	p= 2.33
+50		0°37'	1°09'	q=199.97
521		0°25'	1°31'	Y=399.81
+50		0°15'	1°51'	
520		0°07'	2°08'	
+50		0°03'	2°23'	
519		0°00¼'	2°35'	
518+77.99	P.S.	0°00'	2°40'	



SAMPLE X-SEC. NOTES- LOCATION

⑦ Loc. ..... Line Date 4-18-45 ..... Party Grey, Brunk, Finch

Project Cascade Locks - Vienta

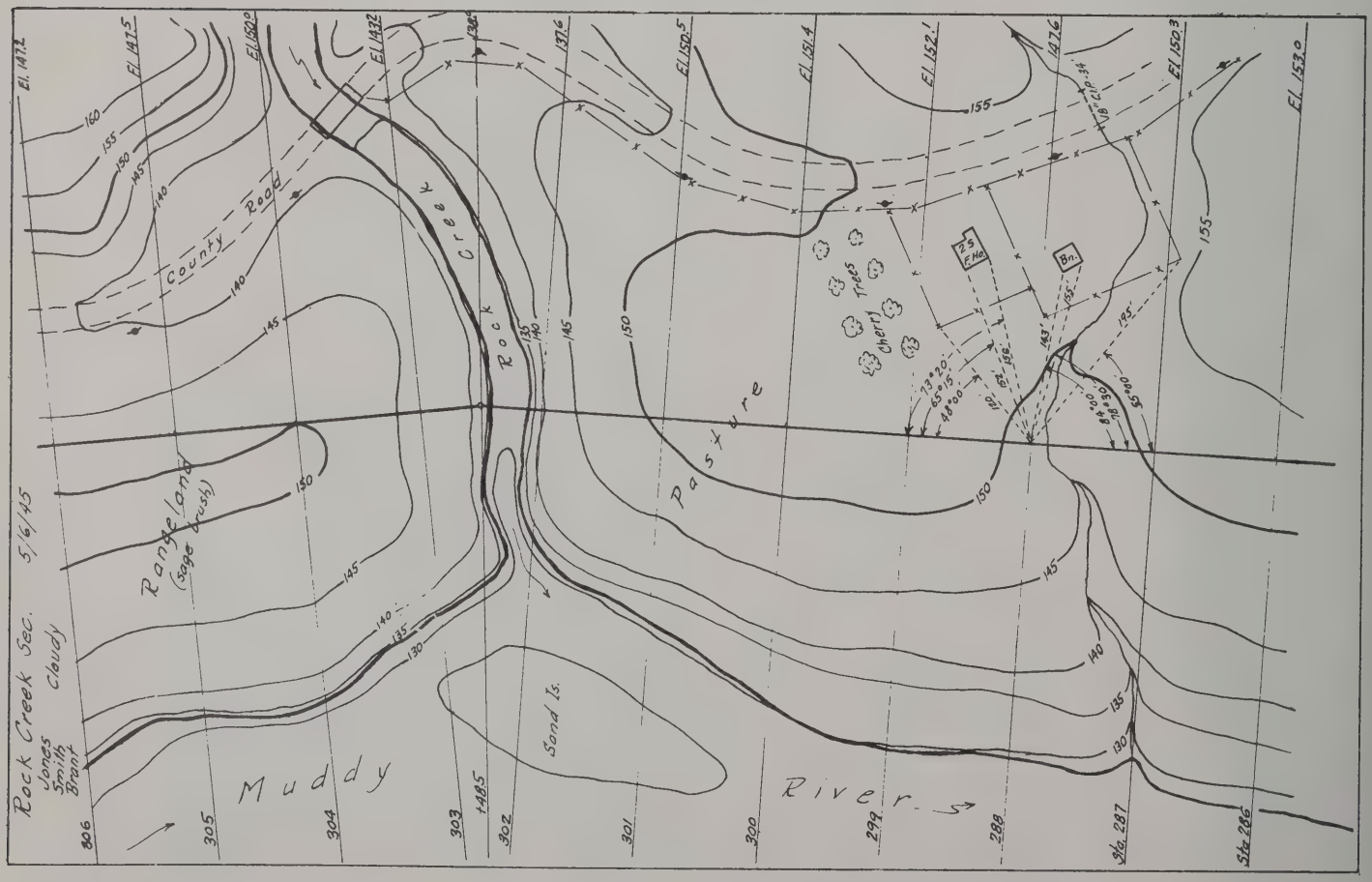
Form E-34—20M—3-44

Rain

LEVEL SHEETS ⑦

X-Sec.	Notes	Left			℄ Elev.	Right				
255	-1.3 / 100	-0.4 / 62	-1.5 / 53	+7.0 / 40	+7.4 / 17.0	97.2	+4.7 / 50	+7.6 / 74	+12.2 / 100	
+73	-2.4 / 95	-1.4 / 45		+5.4 / 41	+5.9 / 10	99.2	0.0 / 26	+3.0 / 39	+6.8 / 89	
254	-8.3 / 97	-7.8 / 47	-2.2 / 44	-8.8 / 29	-0.7 / 23	105.2	-1.9 / 10	-5.3 / 76	-4.2 / 49	-3.4 / 50	-0.4 / 81
+50	-6.3 / 93	-6.2 / 43	-8.7 / 37	-8.7 / 31	-0.7 / 19	105.4	+0.1 / 4	-4.5 / 11	-3.0 / 61	-2.2 / 84	+2.5 / 95
253	-5.2 / 100	-4.9 / 50		-8.1 / 38	-0.5 / 25	106.1	-3.9 / 6	-3.8 / 34	-2.8 / 36	-1.3 / 68	+1.7 / 84

SAMPLE TOPOGRAPHY SHEET



SAMPLE LEVEL NOTES

⑧ Const. Line Date 4-18-45 Party Shanks - R
Pacific Hwy. White - Rod
Project Bear Creek - Deer Creek
Form E-34—20M—3-44

Clear — LEVEL SHEETS ⑧

	+	H.I.	−	Elev.	
B.M.	5.643	531.842			526.199
T.P.	4.326	531.443	4.725	527.117	
T.P.	3.541	528.006	6.978	524.465	
T.P.	4.026	526.347	5.685	522.321	
T.P.	3.784	524.008	6.123	520.224	
T.P.	2.561	519.326	7.243	516.765	
B.M.	1.453	514.085	6.694		512.632
267			4.2	9.9	
+10			7.3	6.8	
+40			3.7	10.4	
+75			4.6	9.5	
268			5.3	8.8	
+50			5.8	8.3	
269			6.2	7.9	
T.P.	6.297	512.071	8.311	505.774	
+50			7.7	4.4	
270			8.8	3.3	
+50			9.6	2.5	
271			10.2	1.9	
+50			10.7	1.4	
B.M.			11.684		500.387

Approx. ½ Mile

B.M. - Std. OSHD disk set in West end of North sidewalk of conc. bridge over Shiner Creek, 4 miles North of N. city limits of Altville on Pacific Hwy. (disk stamped 1X43 - 1936 - 526 feet) Elev. 526.199

B.M. - USC&GS disk set in conc. monument 4.5 miles N. of Altville on Pacific Hwy. 50ft N. and 25' E. of NE corner of 8'x8' conc. box culvert. (disk stamped USC&GS "Y142" - 1934") Elev. 512.636 feet

B.M. OSHD "Z 142" (description on page 9.)

SAMPLE CULVERT NOTES

⑨ Const. Line Date 4/18/45 Party Lamb, Coker, Brill, Wolfe
Project Cascade Locks - Vienta
Inlet and Outlet Ditches
Culvert Station 901+82

STA.	GROUND	GRADE	CROSS-SECTIONS	AREA	VOLUME
		Inlet Ditch			
End Pipe 0+00	2643.7	2642.5	0/1.0 +1.3/3.6 +1.2/0 +1.2/3.6 0/1.0	5.45	
					1.8
0+10	44.1	43.0	0/1.0 +1.2/3.6 +1.2/0 +0.8/2.6 0/1.0	4.30	
					0.8
0+20	45.2	45.2	00/1.0 00/0 00/1.0	00	
		Outlet Ditch			
End Pipe 0+00	42.8	42.0	0/1.0 +0.8/2.6 +0.8/0 +0.8/2.6 0/1.0	2.88	
					1.4
0+27	40.8	40.8	00/1.0 00/0 00/1.0	00	
			Trench Exc. =		4.0 c.y.

Form E-347—10M—12-43 Clear ⑨

OREGON STATE HIGHWAY COMMISSION

CULVERT DATA

STATION 901+82

Install ✓ or Salvage
Size 24" Length 86' Class Std. Str. C.M.P.
Skew Sta.: Lt. 901+75 Rt. 901+88
In Place: Ft. Lt. — Ft. Rt. —
Extend: Ft. Lt. — Ft. Rt. —
Pipe Used: New 72' Salvaged 14'
Elevation: Lt. 2642.5 Rt. 2642.0
Min. Cover 3.4' Total Fall 0.5'

Culvert Exc. 3.5 Ft. Wide-Sides Vertical

00/40.0 +1.2/40.0 +0.6/0 +1.0/25.0 +0.8/46.0 00/46.0 =

149.80 X 3.5 / 54 = 9.7 cu. yd. Struc. Exc.

SAMPLE X-SEC. NOTES-CONS'T.

(13) Const. Line Date 3/16/45 Party Stoub
Pacific Hwy. Anderson
Project Bear Creek - Deer Creek Benson

Rain (13)

OREGON STATE HIGHWAY COMMISSION
CONSTRUCTION CROSS SECTION NOTES
Form E 23—5M—10-43

STATION	Ground Elev	Grade Elev.	CROSS SECTION Left	READINGS C	READINGS Right	Remarks or Sketches
			(F92)		(F86)	
244+50	617.7	623.5	-8.0 38.4 -8.0 20.0	-5.8	-4.0 3.0 -5.0 20.0 -9.0 37.2	
			Rem. Neat Sec. +1.2 20.0		00 10.0 -0.4 28.0	
+32					00 Ditch	Profile Grade carried 10' R.F. super. 0.4 per ft.
			(F42)		(00) (00)	
244	621.3	623.3	-3.0 26.8 -3.8 16.0	-2.0	-0.4 20.0 -0.4 36.0	
			Rem. N.S. +1.2 20.0		00 10.0 -2.4 28.0	
			Ref. +0.7 30.0 (00) +1.2 20.0 +5.0 10.0		(C26)	Ref. +2.8 36.4
+50	627.5	623.1		+4.2	+3.0 8.0 +5.3 23.0 +2.2 16.4	
			Rem. +1.2 20.0		00 10.0 -0.4 20.0 -2.4 28.0 -2.0 37.0	
			Ref. +1.0 47.2 (C38) +3.0 37.2 +9.5 28.0		(C66)	Ref. +7.6 55.2
243	628.4	622.9		+5.5	+5.0 6.0 +9.0 27.0 +6.2 45.2	Grade raised 0.2 feet.
			Rem. +4.8 39.0 -1.2 29.0 -3.8 28.0 +1.0 20.0		+0.2 10.0 -0.2 20.0 -2.2 28.0 +6.0 43.8	

SAMPLE X-SEC. NOTES-STOCKPILE

Rain
Const. Line Date 3/5/45 Party Brown
White
Black
(3)
Project Bear Creek - Deer Creek
Form E-34—20M—3-44 Orig. Ground Sections

	Orig. Ground HI. - 10.00 - 4.00	6.00 Ref. BM.
	3/4" - 0" Stockpile - Sta. 298+54	
0+00	1.9 0 1.9 12 / 1.9 30 2.3 49 / 2.3 67 2.3 79	
0+12	1.8 0 1.8 12 / 1.9 30 2.0 49 / 2.1 67 2.2 79	
0+31	6.8 6.7 / 6.8 6.8 6.7 / 1.8 1.7 / 1.8 1.8 1.7 1.7 / 0 12 30 49 67 79	
Rem.	6.8 0.8 0.7 0.7 O.G. / 0 12 35 58 70	
0+50	6.8 6.8 6.6 6.7 / 1.6 1.8 1.6 1.6 1.7 1.6 / 0 12 30 49 67 79	
Rem.	O.G. 6.6 0.5 0.6 0.5 6.7 / 1 11 35 59 72	
0+69	6.6 6.5 6.3 6.4 / 1.6 1.4 1.2 1.4 1.4 / 0 12 30 49 67 79	
Rem.	6.6 0.5 0.5 0.6 6.4 / 1 10 35 62 72	
0+88	1.7 1.5 / 1.4 1.4 / 1.4 1.4 / 0 12 30 49 67 79	

Remeasure - 3/4" - 0" Stockpile - Sta. 298+54 (3)
Date - 4/7/45 Clear LEVEL SHEETS Party - Brown White Black

	B.M. 6.00	+9.00	Rem. H.I. 15.00		Area	Cu. Yds.
0+10		00 Sec. 6.8 0	Wedge & 2 Pyr.	6.9 72		
						86.6
0+22 O.G. Interp.		(6.8 0 6.7 12	6.8 30 6.9 49	6.9 58 6.9 70)		
0+22		6.8 0 0.7 12	0.6 35 0.5 58	6.9 70	360.55	
						118.4
0+31		See Orig. Ground			349.95	
						252.6
0+50		See O.G.			367.90	
						257.6
0+69		See O.G.			364.10	
						161.5
O.G. Interp.		(6.7 0 6.5 10	6.4 30 6.4 62	6.4 72)		
0+81		6.7 0 0.5 10	0.6 35 0.6 62	6.4 72	362.85	
						99.1
0+95		00 Sec. 6.7 0	Wedge & 2 Pyr.	6.9 72		

SECTION 8. CULVERTS AND DRAINAGE

Article

1. Design of Waterway Areas for Bridges and Culverts.
2. Box Culverts.
3. Grade or Slope Average Stream Bed to be Shown.
4. Drainage Area to be Determined and Shown on Maps and Profiles.
5. Kind and Type of Culvert Pipe to be Used.
6. Inlet and Outlet Ditches.
7. Side Ditches.
8. Side Drains.
9. Culverts at New Road Approaches.
10. Surface Ditches.
11. Special Drainage.
12. Culverts to be Located at Right Angles to Center-line.
13. Headwall or Wingwalls to Culverts.
14. Culvert Location May be Altered After Clearing Site.
15. Additional Culvert Expense to be Approved.
16. Inspection of Corrugated Metal Pipe.
17. Inspection of Concrete Pipe.
18. Procedure for Installing Culverts Under High Fills.
19. Give Culvert List to Contractor and Engineer of Materials.

Article 1—Design of Waterway Areas for Bridges and Culverts

Attention is called to Highway Department Technical Bulletin No. 4 "Design of Waterway Areas for Bridges and Culverts". The tables and other data contained in this bulletin will be found very valuable.

Article 2—Box Culverts

On projects involving concrete box culverts, the Resident Engineer will, immediately after being assigned the project, furnish the Bridge Department (through the office of the Division Engineer) with the necessary data for the checking of reinforcing steel lists. These data will include the length back to back of head walls, the skew angle with the highway center line, the grade line of the invert, the depth of cover over the top slab, whether aprons between wing walls are needed, length and angle of wing walls, cross section of roadway at culvert showing embankment slopes and roadway width, and any other pertinent data.

The Bridge Department will check and approve reinforcing steel lists on the basis of these data and will supply the Resident Engineer with copies of the approved lists.

Box culverts should be designated thus: 6 feet wide by 4 feet high, by writing the words after the proper dimensions instead of merely writing 6 by 4, as has been frequently done in the past.

Please see that this demarkation between width and height is carefully recorded on all profiles, maps and estimates so that there can be no mistake in width and height.

Article 3—Grade or Slope of Average Stream Bed to be Shown

In addition to the information required on location surveys regarding drainage areas, the grade or slope of the culvert or average grade of the stream bed at the site of the culvert or bridge shall be shown. This information is necessary before the capacity of any culvert can be checked.

Article 4—Drainage Area to be Determined and Shown on Maps and Profile

All drainage areas should be measured and shown on all location profiles, and in addition a sketch map should be prepared showing all drainage areas. When it is necessary to do field work in order to obtain the information needed to prepare such maps, the areas may be measured in the field by compass and stadia. In extremely brushy country distances may be obtained by pacing.

If all areas are small they may be shown on a tracing of the 400-foot map. If areas are so large that such a scale will make the map cumbersome the 1,000- or 2,000-foot scales may be used. Thin tracing paper will be used for these sketches. The average fall of the drainage area must be noted, approximately four slopes being used, thus:

5 feet in 1,000 feet,
20 feet in 1,000 feet,
50 feet in 1,000 feet, and
100 feet or more in 1,000 feet.

The foregoing applies to all locations except revisions of existing highways where the necessary size of culvert has been established by existing structures.

Article 5—Limitations on Type and Use of Culvert Pipe and Box Culverts

In general, concrete culvert pipe is to be used on the coastal slope areas and within 50-mile radii of manufacturing plants; corrugated metal pipe normally to be used elsewhere. Also, in general, pipe extensions are to be in kind and size. Special conditions may warrant deviation from the above policy.

The 12-inch size of culverts, except for extensions of adequate capacities, is restricted to road approaches and other drains not across highway roadways.

Concrete culvert pipe, installed as specified, shall be limited in use under embankments as follows:

1. Standard strength concrete culvert pipe:

Size of Pipe	*Max. Fill Over Pipe*
12", 15" and 18"	32.0 Feet
24" and 30"	25.0 "
36" and 42"	23.0 "
48" to 84"	21.5 "

2. Extra-strength concrete culvert pipe: For all sizes, the maximum height of fill over the pipe shall be 43.0 feet.
3. Where the height of fill over extra-strength concrete pipe exceeds 43 feet, the installation by the "imperfect trench" method described hereinafter in Article 19 permits increase in safe height of fill over the pipe to a maximum of 57.0 feet.

Corrugated metal culvert pipe, installed as specified, shall be limited in use under embankments as follows:

1. Standard strength corrugated metal pipe:

Size	*Gage*	*Max. Fill Over Pipe*
8"	16	80 Feet
10"	16	70 "
12"	16	60 "
15"	16	50 "
18"	16	40 "
21"	16	35 "
24"	14	45 "
30"	14	30 "
36"	12	30 "
42" and 48"	12	25 "
54"	12	20 "
60"	10	25 "
66"	10	20 "
72"	10	15 "
78"	8	25 "
84"	8	20 "
90" and 96"	8	15 "

2. Extra-strength corrugated metal pipe:

Size	*Gage*	*Max. Fill Over Pipe*
8", 10" and 12"	14	100 Feet
15"	14	70 "
18"	14	60 "
21"	14	50 "
24"	12	70 "
30"	12	45 "
36"	10	45 "
42", 48" and 54"	10	35 "
60"	8	40 "
66"	8	30 "
72"	8	25 "

3. Where the height of fill over corrugated metal pipe exceeds 43 feet, the installation shall be by the "imperfect trench" method described hereinafter in Article 19.
4. Corrugated metal pipe and gages heavier than those above given are to be used where fill heights exceed those given above for "extra-strength corrugated metal pipe" and under special conditions, in accordance with the manufacturer's recommendations.

Arch-type corrugated metal pipe culverts, in general, are to be used where headroom is limited or where the stream to be provided for is relatively wide and shallow. For all specified sizes other than 50" x 31", 65" x 40" and 72" x 44", the height of fill over the pipe shall not exceed 20 feet. For the 50" x 31", 65" x 40" and 72" x 44" sizes of pipe, the height of fill over the pipe shall not exceed 15 feet.

Structural plate pipe and pipe arches, and reinforced concrete box culverts are to be used only in accordance with the recommendations of the Bridge Division.

Article 6—Minimum Cover for Pipe Culverts

For all concrete pipe culverts, a minimum cover of 6 inches of earth or fine graded material shall be provided directly over the top of the pipe, and the distance from finished grade to top of pipe shall not be less than 18 inches.

For all corrugated metal pipe culverts the cover material directly over the pipe shall be well graded material of 3"—0 or less in size, and the minimum cover over the pipe, to finished grade shall be as follows:

Full-circle type, 120" or less diameter, (a) under Portland cement concrete pavement—1/7th of diameter, minimum 14"; and (b) under other surfacings—1/5th of diameter, minimum 12".

Full-circle type, over 120" diameter, (a) under Portland cement concrete pavement—minimum 18"; and (b) under other surfacings—minimum 24".

Pipe-arch type, (a) under Portland cement concrete pavement—1/14th of span—minimum 14"; and (b) under other surfacings—1/10th of span—minimum 12".

Structural plate type pipe, same as above for "full-circle type".

Structural plate pipe arches, same as above for "pipe-arch type".

Twelve inch pipe may be specified and used as drains under road approaches, etc.

Article 7—Inlet and Outlet Ditches

Where inlet and outlet ditches to culverts are to be constructed, they shall be of ample size and proper shape to take the maximum flow, and shall present a neat and workmanlike appearance upon completion of the contract.

Article 8—Side Ditches

The Resident Engineer must see that all side ditches drain properly.

Side ditches shall be constructed at all places where it is apparent that water cannot properly drain from a low place.

Article 9—Side Drains

Any culvert which has been previously installed for an owner, which is affected by a new location, shall be relaid in the proper location to fit the new condition at the expense of the Highway Department.

Article 10—Culverts at New Road Approaches

If necessary, culverts shall be installed at new approach roads and places of entry to property adjacent to the newly located highway.

Article 11—Surface Ditches

Surface ditches shall be constructed at the top of cut slopes only at places where it is necessary to intercept flow from small channels, which otherwise would run down the slope.

Article 12—Special Drainage

If springs or soft places should develop as the grading progresses, and for which no provision has been made on the plans, steps should be taken immediately to secure proper sub-drainage. Special attention should be given to the drainage of ground on which high fills are to be placed. It sometimes happens that underground drainage is brought to the ground surface when the weight of the fill takes effect, thus saturating the fill and causing it to slide. Where the area involved is of small extent, a blind drain will often suffice, but if the affected area is large, the Division Engineer should be consulted as to the proper means to use, and to issue the necessary orders for the extra work to be performed.

Article 13—Culverts to be Located at Right Angles to Centerline

Culverts shall be placed at right angles to the centerline of highway, except where topographical conditions are so extreme as to require a skew location.

Article 14—Headwalls or Wingwalls to Culverts

If headwalls are required to lead the water to a culvert, they shall be constructed parallel to the centerline of the highway. Wingwalls will be constructed as shown on the plans.

Article 15—Culvert Location May be Altered After Clearing Site

After the clearing has been completed and the slope stakes are placed, the Resident Engineer can often effect an economy or improvement in culvert location. If the specified location of a culvert appears to be wrong, it shall be located in the proper place.

Article 16—Additional Culvert Expense to be Approved

If proposed changes involve additional expense, the matter shall be taken up with the Division Engineer before the changes are made.

In situations where there may be danger of a part of the roadbed sliding, it may be advisable to recommend the installation of a section of slip joint pipe, as a protection against loss of entire roadbed and culvert.

Article 17—Inspection of Corrugated Metal Pipe Culvert

(a) Each section of metal culvert pipe should be carefully examined prior to installation for abrasions or defects in the spelter coating or the protective bituminous coating in the case of dipped pipe. All defective sections which cannot be repaired or remedied in such manner as to place them in first class condition, should be rejected.

Join sections of metal pipe properly.

(b) In assembling the various sections forming a metal pipe culvert, care should be exercised to see that the sections are assembled in proper sequence in regard to the flow line, the upstream section being placed inside the downstream section at the joint.

Joint bands should be made to fit the corrugations and be cinched up tight. Where field rivets or bolts are used, care should be exercised to see that they are actually drawn up tight and not simply stuck into holes, as has been done in may cases observed on inspection. Special precaution should be taken with the riveting and joint installation around the lower portion of the culvert.

(c) Where pipes are bedded in a cushion of sand or soft material, precaution should be taken at the ends of the pipe to avoid erosion or washing out of the cushion later on.

Article 18—Inspection of Concrete Pipe

(a) Concrete pipe should not be dumped either from a truck or into a trench without the employment of suitable skids and runways. All pipe sections should be inspected for cracks or defective joints before they are placed in position. Cracked or damaged sections should be rejected as plaster patches are very short lived.

(b) A special check should be made of the delivery of pipes from the manufacturers. Repeated instances have been found where truck loads of large size pipe have been sent out from the factory without skids or help to unload the pipe except by dropping from the truck.

Article 19—Procedure for Installing Culverts Under High Hills

Where the height of embankment to be constructed over a pipe culvert exceeds forty-three (43) feet, the embankment fill shall be constructed in six-inch layers to a height above the top of the pipe equal to the external diameter of the pipe. Each layer shall be thoroughly compacted over the pipe and for a width on each side equal to the external diameter of the pipe by rolling or tamping with mechanical rammers or by hand tamping with heavy iron tampers having a tamping face not exceeding 25 square inches in area.

When the compacted embankment has reached a height above the top of the pipe equal to the external diameter of the pipe, the earth material in the prism directly over the pipe shall be excavated and the trench backfilled with earth material deposited in the loosest possible condition. The remainder of the embankment may then be constructed in the manner specified for embankment construction not involving pipe culverts.

The attention of the Field Engineer is directed to the fact that the purpose of the trenching method is to simulate conditions which normally exist in the construction of a sewer ditch wherein the filling material over the pipe being more compressible than the the sides of the trench, transmits the greater portion of its load into the side walls, thus relieving the pipe in large measure from vertical load.

A competent member of the engineering party should be assigned to act as inspector during the installation of culverts and drain tiles and in addition the Resident Engineer should give personal supervision at critical times to see that careless methods of installation are not employed.

Article 20—Give Culvert List to Contractor and Engineer of Materials

When the requirements for corrugated iron culverts are furnished the contractor for a specific job, a copy of the list should be sent to the Engineer of Materials. This list should show the station numbers and the length of the culverts. This is necessary in order to check all details for the culvert at the factory inspection; as certain contractors have been ordering culverts merely as certain lengths of pipe and not as completed culverts. This does not give the fabricator or inspector sufficient information regarding the reinforced ends or other details necessary in the completed culvert.

SECTION 9. RIGHT OF WAY

Article

1. Width of Right of Way.
2. Special Rights of Way, as Stockpiles, Quarries, Etc.
3. Vacated Streets.
4. Obtain Copy of Description of all Property on New Line.
5. Easements.
6. Tie in Section and Sub-division Lines.
7. All property and Monument Ties to be Made From Tangents.
8. Tie City Limits and Streets.
9. Preserve all City Monuments.
10. Tie block and Lot Corners.
11. Encroachments.
12. Locating Engineers to Make Right of Way Report.
13. Preparation of Descriptions.
14. Data to be Submitted.
15. Request for Authority to Purchase Right of Way.
16. No Right of Way Agreements to be Made Unless Authorized.
17. Additional Right of Way.
18. Abandonment or Retention of Old Right of Way.
19. Markers to be Set on State Highway Property.
20. Areas to be Computed.
21. Throughways.

Article 1—Width of Right of Way

Right of way boundary lines should be so located as to provide at least 10 feet of width between the edge of slope of cut or fill and each boundary line. It is also desirable that right of way widths be kept reasonably uniform, especially where the work is heavy and right of way costs are moderate. Widening or narrowing the right of way over short sections to meet requirements for individual cuts or fills is not good practice and will, therefore, not be permitted.

The standard width for four-lane highways and for highways on the interstate system shall be 250 feet, except in heavily built up areas where it shall be 150 feet. For all other primary highways the standard width shall be 100 feet, and for secondary highways 80 feet, unless special provision is made by the Construction Engineer for a reduced or increased width.

Extra width shall be provided to accommodate appreciable cuts or fills.

Width of right of way across national forest lands shall be as set forth in Public Roads Administration regulation L 7 modified by agreement between the Forester and Commissioner as hereinafter cited.

> "*Reg. L-7.* The right-of-way over national forest land for any state or county highway or road which is a part of the approved system of public roads shall be 132 feet in width for roads of class 1 or class 2, and 66 feet in width for roads of class 3 or other county roads of a secondary character; the center line of the highway or road to be the center line of the right-of-way except where otherwise provided by permit. National forest lands within the limits of such right-of-way shall continue to be administered by the Forest Service, but their use for highway or road purposes shall be the dominant use, and no occupancy for other purposes shall hereafter be authorized by the Forest Supervisor or Regional Forester unless approved and concurred in by the appropriate State or county officials, but if agreement can not be reached regarding other forms of use or occupancy regarded by the Regional Forester as essential to the proper use and management of the national forest the matter shall be submitted to the Secretary of Agriculture for final decision."

Later interpretation agreed upon by the Commissioner and the Forester have developed a more liberal policy which is quoted as follows:

> "On road plans for Class 1 and 2 Forest Highways a line will be shown 200 feet on each side of the center line. On Class 3 Forest Highways a line will be shown 100 feet on each side of the center line. This line will be marked with a designation 'Set-back line for special treatment—occupied and used only upon approval of the Regional Forester'.
>
> The showing of this line upon the road plans will assure anyone examining the plans that careful and special consideration is contemplated on this strip by the Forest Service. The showing of this line on the plans does not in any way change the stipulation of Regulation L-7, which is still in effect, and the right-of-way for construction purposes will still be in accordance with this regulation."

While technically the two-chain width of right of way still obtains, the Forest Service recognizes the adjacent areas as reserved and will permit its use only by special permission.

Right of way over National Forests shall be acquired by a special use permit from the local forest Supervisor by the Division Engineer.

In preparing the basic data for writing right of way descriptions, photostatic copies of recorded deeds and recorded plats shall be acquired in all counties where deeds are recorded by the photostatic process. In those counties, if any, which still record deeds by typing, photostatic copies of deeds may possibly be obtained from the abstract companies. Where plats are recorded as tracings, prints of such shall be obtained.

Right of way over unappropriated and unreserved Public Domain and Oregon and California Revested Land shall be two hundred (200) feet in width, one hundred (100) feet on each side of center line and will be acquired by submission of tracings by the Right of way Department. The information necessary to prepare these tracings must be shown on the right of way map. Descriptions will not be necessary.

Government lands fall in two classifications, viz: Reserved lands and unreserved or unappropriated. Reserved lands are those set aside by the Taylor Grazing Act, and those set aside for reclamation projects, power site reserves, etc. Applications for the two classifications are handled in different ways, and in order to expedite acquisition, it is necessary that the field engineer determine the classification at the time other rights of way data is submitted. Checks must be made with the District Land Offices, and the necessary information secured and forwarded.

Rights of way across Indian Reservations shall be handled in the same way as private lands.

Article 2—Special Rights of Way, as for Stockpiles, Quarries, Etc.

A "metes and bounds" description shall be prepared for parcels of land which are not a part of the regular right of way.

Before making a survey or preparing a description for a stockpile site the engineer should contact the owner of the property to be acquired and ascertain, if possible, whether the owner is willing to sell and whether the price is reasonable. Property to be used for stockpile sites cannot be condemned.

All stockpile sites are to be purchased, if possible, and not leased. There may be special cases where it is impossible to purchase outright. In such cases the approval of the State Highway Engineer and Commission is necessary before negotiations are started for lease.

Article 3—Vacated Streets

Vacated streets are occasionally involved in right of way negotiations. The Resident Engineer must ascertain whether or not any streets of this class are involved when procuring property data from county records.

Article 4—Obtain Copy of Description of all Property on New Line

Form E-47 "Statement of Information" has been prepared for use in acquiring certain information from the county records.

Two of these forms must accompany each description submitted to the Construction Engineer, Salem, for checking and should show all information called for. It will be noted that in most instances it will be necessary to contact each of the following offices, viz., County Assessor for assessments, County Recorder for correct ownership and Sheriff for tax status and address of owner. (In copying names of present owners, it is very important that they be shown *exactly* as written on the recorded deeds.)

It might appear that these data could be shown on the regular description form, but inasmuch as it is necessary to copy the owner's deed, it will be convenient to assemble all other data pertaining thereto on one separate page, thereby keeping the description forms free from notes, etc., which might be confusing to anyone transcribing or otherwise handling them later.

A supply of these forms will be kept in stock at Salem storeroom and may be obtained by regular requisition.

Article 5—Easements

In preparing descriptions for right of way within cities, towns or thickly settled areas, it is sometimes necessary or convenient to take slope easements for slopes in lieu of purchasing additional width of right of way. When this condition exists, the description for easement should be prepared separately from and submitted along with the regular right of way description.

Article 6—Tie in Section and Sub-division Lines

All location lines shall be tied to section and sub-division lines. Preliminary lines will be tied only to such corners as are convenient, unless the preliminary survey is not to be fol-

lowed soon by the location, in which case, all available corners will be tied to the preliminary survey.

Ties on a section or a sub-division line shall be made to corners, if available, on both sides of the survey, and direct intersection made with the property line, noting the angle such line makes with the survey as well as the distance to each corner. (See Sec. 5, Art. 15.)

Article 7—All Property and Monument Ties to be Made From Tangents

All property, street, road and city lines which are crossed by the survey shall be tied to the tangent or semi-tangent and not to the curve. All field ties shall be shown on 1 inch equals 100 foot scale maps.

Article 8—Tie City Limits and Streets

Obtain direct ties to all city limit and street lines which are crossed by the proposed line.

Article 9—Preserve all City Monuments

All city monuments must be preserved, either by being left in place and protected by covers or referenced with permanent markers. Whereever any block or lot corner comes within the right of way the corner shall be set back along the property line in a manner at least as permanent as the original marker.

Article 10—Tie to Block and Lot Corners

Where the line crosses subdivided property, such as city blocks, at least two (2) property corners in each block shall be tied to center line if they can be found.

Article 11—Encroachments

A tracing map shall be prepared showing each railroad encroachment involved on any project. Cross sections shall be shown on such maps in the best manner possible to indicate the relationship between the center line of the railroad track, (not center line of railroad right of way) and our located center line of the highway throughout the encroachment.

About 5 or 6 cross sections shall be selected and shown on the map. One of these shall be a section at the closest point to the railroad tracks, also sections at each end of the proposed encroachment.

A tie shall be made to the stationing of the railroad from our center line. All details of this tie shall be clearly shown on the encroachment map. The railroad centerline shall not be projected onto the map but shall be platted from actual measurements to the center of the track.

Cross sections shall be taken every 50 feet throughout the area of encroachment. These shall be platted on a roll and shall be submitted wtih the map. Typical sections shown on the map shall be taken from this roll. These measurements shall be taken by means of a steel tape. At times it might be necessary to employ a transit in making these measurements.

Field ties shall be made at both ends of easements and encroachments, and *both* highway and railroad stationing shown. Railroad stationing at changes of encroachment widths must be shown. Highway stationing at these points need only to be approximate.

Distances from the center line of the track to the encroachment line shall be shown. Where the line is irregular the maximum and minimum distances shall be shown.

In taking location cross sections, data on ground line should be secured at each station to the center of the railroad.

Encroachment maps should be made up using a scale of one inch equals one hundred feet. The cross sections to be imposed on this map should be shown with a scale of one inch equals ten feet. If several encroachments are involved, they may be placed on a continuous roll tracing map.

Encroachment of telephone lines, power lines, sign boards, etc., shall be described briefly. Descriptions may be general in nature and merely state that certain property from station to station is encumbered by a power line, sign board, etc.

Article 12—Locating Engineers to Make Right of Way Report

A "Locating Engineer's Right of Way Report" form shall be used by all engineers making highway location surveys over a section which involves the purchase of new or additional right of way.

This report form shall be completely filled in and shall then be dispatched as indicated on the form.

Additional copies may be obtained from the Construction Engineer's office (See sample at end of this section.)

Article 13—Preparation of Description

All questions as to the exact location of the center line should be settled before any right of way descriptions are written.

All information necessary for the writing and checking of right of way descriptions, encroachments, etc., shall appear on the 100 foot to the inch location map. When the map is completed, it should be sent to the Construction Engineer for tracing. The original will then be returned.

When any alterations or additions are made on the original map, the necessary data, preferably on a print, shall be forwarded to the Construction Engineer so that the tracing may be corrected.

Form E-31 is to be used for preparation of "metes and bounds" descriptions, and form E-151 Rev. for "center line" descriptions. Samples of forms E-31 and E-151 Rev. will be found at the end of this section and said forms may be obtained by regular method of requisition.

In preparing forms E-31 and E-151 Rev., the grantor's true name exactly as shown on the deed record; if married, give wife's name also. Give the volume and page numbers of the deed record wherein the grantor's deed to the property is recorded. Give the location of the parcel of land being acquired, by Government subdivision as nearly as possible, such as "N.E. ¼ of N.W. ¼" or N.½ of N.W. ¼". This should be given regardless of whether the parcel is a portion of D. L. C. or not, as this makes it possible to locate the said parcel on any map. This is not necessary when the parcel is a portion of a recorded town plat.

All surveys for the purpose of obtaining data from which to write descriptions for right of way through properties which are located within the boundaries of *platted* and *recorded tracts* should be very carefully made with respect to obtaining the necessary ties to the lot and block corners of the properties through which the highway center line passes.

In preparing the basic data for writing right of way descriptions, much time and cost may be saved by procuring photostatic copies of recorded deeds instead of laboriously copying from the records.

This shall be done in all counties where deeds are recorded by the photostatic process. In those counties, if any, which still record deeds by typing, photostatic copies of deeds may possibly be obtained from the abstract companies.

In general, a description should be as short and simple as possible, complete and specific as to the position of the boundaries, devoid of uncertainties or possible ambiguity, clear as to intent of what is being conveyed and free from any excess language which adds nothing to the meaning or construction.

Descriptions, in general, are in three divisions, viz. The Caption, the Body and the Qualifying Clause. The Caption is a statement of the general location of the parcel as to Tract, Subdivision, Section, Township, Range, County and State. The Body is the recital of the boundaries of the parcel, giving dimensions, ties and other references. The Qualifying Clause recites exceptions, reservations and the like. These, in a large percentage of descriptions, are set out in separate paragraphs but they may, in some instances, be intermingled or combined to advantage as in the following: "A parcel of land, being the West 10 feet of the Northeast quarter of the Northwest quarter of Sec. ——, Twp. ——, R. ——, W.M. County ————, State ————."

In writing descriptions, simple understandable phraseology should be used, avoiding duplicate phrasing and reiteration. There is no particular virtue in the use of "to a point" after courses and distances unless the point has a peculiar designation or a certain significance. Bearings need not be marked "True" as all bearings are taken to be true bearings unless otherwise designated. In Western Oregon, many tracts of land have been described as being portions of Donation Land Claims without any particular reference to Section Subdivisions. In acquiring parcels from such tracts, the tie to the beginning point of the description should be made to the D.L.C. corner, also to Sec. corner or other recognized monument. If it is not feasible to make an accurate tie to such a corner, a secondary tie "more or less" should be used in the description to enable the Abstractor to more readily locate the property.

There are two forms of descriptions most commonly used in conveying property, viz. the "Metes and Bounds" and the "Center Line" descriptions.

The "Metes and Bounds" description, generally used in coveying a parcel or tract which is all or a portion of a larger tract, is a recital of the boundary lines of the parcel being conveyed. If the "Metes and Bounds" description is intended to follow certain definite lines, such as Section lines, property lines, etc., such should be stated, making the courses and distances secondary. When, as often happens, the property line is definitely intended to be a boundary of the described parcel but it is practically

impossible to accurately locate said property line on the ground, general terms should be used as, "approximately 500 feet to the West line of said property; thence Southerly along said West line" etc.

For right of way where the parcel being conveyed is a strip of land, the "Center Line" descriptions should be used in most cases. In describing a center line, a curve is completely defined when two elements are given such as the radius and the length of curve. These, together with direction of curvature (Right or Left) and the bearing of the long chord are all that is necessary for description purposes. The same is true for spiral curves when the length of spiral and the degree of curve at the P. S. C. or P. C. S. is given. As our center line is continuous, the degree of curve is always given either before or after the spiral description except in rare instances when two spirals meet without an intervening simple curve. In such instances, the radius of the curve where the spirals meet should be given, or the chord bearing and chord distance may be given. Center line descriptions should start and end beyond the limits of the parcel being conveyed with a qualifying clause stating the station where the center line crosses the boundaries of the property concerned or the qualifying clause may state the stations opposite which either side of the strip of land crosses said boundaries. In platted subdivisions or properties where the land values are high, the station of such intersections should be determined as nearly accurate as possible. Where land values are low such intersections may be approximations and should be so noted.

The beginning point should be described with reference to the nearest Government Corner, Donation Land Claim Cor., or other well recognized and established Monument near the point of beginning. In platted property, the tie should be made to Monuments or Block corners controlling the subdivision, and, if such Monuments or Corners are well established, no additional ties are necessary.

All right of way descriptions must be submitted to the Construction Engineer, Salem, through regular channels for checking.

Article 14—Data to be Submitted

The following data shall be included with all property descriptions:

(a) Notes for all field ties.
(b) Description of each owner's property through which the proposed line runs, to be obtained from County Records, Form E-47.
(c) Notes or advice regarding Meridian determination.
(d) Coordinate sheets.
(e) Calculation sketch sheets.
(f) Locating Engineer's Right of Way Report. (To be submitted only on new located line covering a section of highway and not for individual parcels.)
(g) Form E-29, Original Authorization request.

The tracing of the 100-foot scale map will be colored by the Right of way Department.

Article 15—Request for Authority to Purchase Right of Way

Resident Engineers will submit an "Original Authorization", Form E-29, to negotiate for *each* individual parcel of property that is to be acquired by the Right of way Department for any use whatsoever (right of way over new projects, material sources, stockpile sites, also including properties that are to be acquired for purposes of trades or adjustments).

When an "Original Authorization" has been approved, any subsequent change in widths of right of way, dimensions of parcels to be acquired, or other changes must be outlined upon a second request for and approval obtained before purchasing.

One copy only of this form must accompany each description when submitted. All information regarding the reasons for acquisition, the location, the ownership and the approximate value of each parcel shall be carefully noted. Any authority to purchase property, that is in any sense irregular or complicated by agreements that will involve special consideration of the Construction or Right of way Department, must be clearly outlined and explained in full detail.

Article 16—No Right of Way Agreements to be Made Unless Authorized

Agreements for the purchase or lease of right of way, or sources of materials, storage sites, etc., shall be made contingent upon the approval of the State Highway Commission and not otherwise.

Article 17—Additional Right of Way

It is frequently found necessary to purchase additional right of way after construction work

has been started in order to have sufficient width for fill and cut slopes. The right of way widths are of such importance that they should receive particular attention of the Locating Engineer. Before right of way descriptions are submitted, they should be carefully checked in detail to see that the proper widths have been provided.

Article 18—Abandonment or Retention of Old Right of Way

(a) *Abandonment*—Quite frequently on a new location or realignment of a section of highway, it will develop that certain parts of the old highway will be of no further use for highway purposes.

Where it is proposed to abandon portions of an old highway, a report, in duplicate, of proposed abandonment of such highway right of way shall be made and sent through regular channels to the Construction Engineer. This report should be accompanied by a description of the right of way involved and by a map of sufficiently large scale colored to clearly indicate the parcels to be retained and/or abandoned.

Forms for use in making up this abandonment report are obtainable at the office of the Construction Engineer.

(b) *Retention of Old Right of way*—Portions of old right of way which remain outside of the uniform right of way lines of the revised alignment and which are desirable to retain for the purpose of storage sites, material sources, building sites, etc., should be definitely described and marked in reference to the new highway location in such a manner that said parcel may be accurately located.

Right of way markers shall be placed at the intersection of the new and old right of way lines and on the old right of way line at all curve points. (See under "100-foot Detail Map", Sec. 11, Art. 6.)

Article 19—Markers to be Set on State Highway Property

(a) Markers are to be set on all Highway Department property at the following points:

1. Every change of right of way width.
2. All corners of property owned by the Highway Department.
3. On right of way lines opposite all curve points, i. e., P. S., P. S. C., P. C. S., P. T.
4. On the right of way lines of tangent and long curves at intervals of not more than 1,000 feet.

(b) Marking shall be accomplished by means of an iron pin, placed on the exact corner or angle and a standard white post placed alongside the pin so that it may be easily located.

The iron pin should be about ¾ inch in diameter by 30 inches long should be driven into the ground so that about one inch protrudes. The distance from center line to the pin should be carefully chained and the pin should be center punched to serve as a permanent center line reference. Iron pins must be requisitioned from the Equipment Department.

Standard guard posts shall be made of 4-inch by 4-inch material and must be requisitioned from the Sign Department. Guard posts are to be set approximately six inches from each iron pin and entirely on the right of way.

Installation of right of way markers shall be made by the Resident Engineer's forces before submission of the final records.

Data in connection with right of way markers shall be recorded on the construction map or profile.

(c) It is the responsibility of the Resident Engineer, on each project under his charge, to attend to the marking of all property under control of the State Highway Department and to promptly notify the Construction Engineer, through the regular channels, when the right of way markers have been set.

(d) *Leased Property Need Not Be Marked*—Property which is under lease need not be marked in any manner other than by temporary hub with guard post placed alongside.

Article 20—Areas to be Computed

The measurement of areas by means of planimeters is satisfactory in cases where land values are not great. However, where the computations can be made reasonably easy, the areas should be calculated. Areas of city properties are all to be mathematically determined in each case.

Article 21—Throughways

The State Highway Commission, at its meeting of November 3 and 4, 1948 adopted a resolution whereby many sections of primary highways were designated as throughways. The sections designated are those sections which have

less than ten commercial establishments catering to the motoring public in a given mile.

On an existing highway, a right of way for which has been acquired without mention or without regard to access waiver or restrictions, an abutting owner has a right inherent in his property to enter and leave the highway, provided that the point of access selected is such that undue hazard to the general public is not created. On such a highway this right cannot be taken from him except upon the payment of compensation properly determined. In many instances compensation payable would only be nominal. The throughway law recognizes this principle and the Commission, therefore, is powerless to deny all access without the payment of compensation.

The Commission or Department has no right without payment of compensation to deny access to existing highways, and therefore, the present policy of attempting to control the access to points of minimum hazard and to fix width approaches to those standards which have been set by the State Highway Engineer is to be continued. If a property owner plans a substantial development on a section of existing highway which should be preserved for further widening and development, he should be referred to the Salem Office so that his problem and the policy of the Commission can be discussed.

Form R-20--62d 6-43

OREGON STATE HIGHWAY COMMISSION
Salem, Oregon

ORIGINAL AUTHORIZATION FOR NEGOTIATION

Date January 26, 19 44

R/W Serial No.

Highway John Day County Grant

Section Prairie City Extreme Limits, Sta. 708+80.8 to Sta. 710+52.9

Name of Owner W. R. Clark Address Prairie City

Agent's Name and Address

☒ Purchase, ☐ Lease, ☐ Easement of . . Acres 2567 Sq. Feet

Subdivision NE¼-SW¼ Section 2 Twp. 13 S., Range 33 E., W. M.

City Prairie City Addition Block Lot

Property to be acquired by ☒ State, ☐ County, ☐ City for the following purpose:

Right of Way

Estimated approximate cost: $ 50.00

Option taken for months. Beginning

Property is ☐ undeveloped, ☐ pasture, ☐ cleared, ☐ farm, ☒ suburban, ☐ city, ☐ cultivated.

Width of Right of Way to be taken:

North of Center Line 40 ft., width ☒ uniform ☐ variable, maximum ft.

of Center Line ft., width ☐ uniform ☐ variable, maximum ft.

Recommended for Approval

Division Engineer

Submitted by

(s) J. M. Smith
Engineer

APPROVED

Construction Engineer

State Highway Engineer

Date

Salem Map File No.

STATE PRINTING

Form R-47--25M--8-44

OREGON STATE HIGHWAY COMMISSION
Salem, Oregon

STATEMENT OF INFORMATION

R/W File No.

Statement of information regarding property from which a parcel is to be acquired by ☒ purchase ☐ lease for use as Right of Way
(Purpose for which property will be used)

Highway John Day	Date March 12 1944
Section Prairie City	Subdivision NE ¼ of the S W ¼
County Grant	Section 2 Twp. 13 S Range 33 E, WM
City Prairie City	Lot Block
Addition	Near Mile Point 176.2

Present Owner Walter R. & Lucy B. Clark Address Box B, Prairie City, Ore.
Grantor (Previous Owner) Zung On
Deed Dated May 5 1930 Deed Recorded April 22 1937 Book 53 Page 473

Assessed Valuation: Land $ 300 Improvements $ 1700
Taxes are delinquent for years 19 42 Taxes paid last 19 41
Remarks:

The above data obtained from Grant County Records by Thompson

Description of Property Described in Said Record

Commencing at the northeast intersection of Front and Main streets whence the the southeast corner of Peet's Addition to Prairie City bears N85°20'E., 58.9 feet; thence N57°50'E along the north boundary of the John Day Highway a distance of 171.6 feet; thence N 15°50'W., a distance of 50 feet; thence S 75°50'W., 171.6 feet to the east side of Main street; thence S 13°28'E along the east side of Main street, 50 feet to the point of beginning. Conta ining .2 acre.

(Note: Description of other parcels are contained in this deed record.)

(If the deed record contains descriptions of other parcels of land, please so note on this form, as shown in the above note.)

OREGON STATE HIGHWAY COMMISSION

SALEM, ORE.

LOCATING ENGINEERS RIGHT OF WAY REPORT.

County Klamath. Date December 6 1944.

Highway The Dalles - California

Section Chemult - Lobert. Station 610 to 3280

The following questions must be answered in full at the time the survey of the project is completed and turned in to the Division Engineer, one copy to be sent direct to the Construction Engineer:-

1 - Are there any encroachments on railroad property yes.

2 - Are typical sections of the encroachments made up and included in the plans? no. Over-crossing near Chemult.

(List station numbers inclusive, of encroachments

654+40 to 661+10

3 - Are all descriptions prepared & ownerships checked? yes
(Attach hereto extra sheet showing ownerships involved, acreage and assessed valuation.)

4 - Have you closed traverse on all metes and bounds descriptions? yes

5 - On your written descriptions have you made mention of, or provided for easements required for slopes yes, retaining walls none drain ditches yes, siphon boxes none, Irrigation ditches yes.

6 - Have descriptions been made up for quarries no, gravel pits no, stock pile sites yes, hauling road easements no channel changes yes ? one description prepared for cinder pit.

7 - Does proposed construction interfere with any water mains? no, sewers no, gas mains no, other conduits none ?(If so attach separate sheet giving ownerships and other available data.)

8 - Do any power poles require moving? yes Are they located on R/W now owned by State no. Company name California-Oregon Power Co.

9 - Do any telephone or telegraph poles require moving yes ?Are they located on R/W now owned by the State no .Company name Pacific Telephone & Telegraph Co., and West Coast Telephone Co.

10 - Are there any buildings or other structures that will require moving? yes.(If so, attach separate sheet giving size, type, center line tie, ownership and approximate value, and probable disposition of same.)

11 - Are there any connections to be made to existing roads that recuire additional R/W yes. Are descriptions prepared for this R/W yes

12 - Have you submitted samples of surfacing materials from the sources indicated, to the Testing Laboratory yes.

13 - Have you checked the answers on the preceeding 12 questions yes

Signature (s) by Loc. Engr.

Two attachments for item 10.

OREGON STATE HIGHWAY COMMISSION

SALEM, ORE.

REPORT ON PROPOSED ABANDONMENT OF HIGHWAY RIGHT OF WAY

Highway Pacific Number 1 Date Jan. 8 1945.

County Douglas

Section Beginning 4.5 miles south of Roseburg at M.P. 204.37, ending at M.P. 204.70
(Describe approximate beginning and ending point with reference to towns and mile points.)

Length of Section to be abandoned Sta.458+20 to Sta.475+65

Miles 0.33 Acres 2.4

Width of Right of Way 60 feet.

Type of Existing Improvement Oil Macadam surfacing

Property originally acquired by court resolution - Deeds to County - Deeds to State. (If by deed, were there any restrictions? none

Description and map covering section to be abandoned must be attached hereto.

Property will revert to Abutting property owners
(County or abutting property owners.)

Reason for abandonment This section will no longer be needed to serve people living thereon.

Would this property be of any further value to the State of Oregon for highway purposes? no

Abandoned highway will not be maintained by County - City.

Abandonment of this section will not involve purchase of new right of way for connecting roads or private outlets.

(If so, give details of length, costs, etc.

Approved:

Division Engineer.

Approved:

Construction Engineer.

Form E-31—SM—4-52

OREGON STATE HIGHWAY DEPARTMENT

DESCRIPTION OF METES AND BOUNDS

Purchase (X) Lease ( ) Easement ( ) R. R. Encroachment ( ) Sale ( ) ..... (Other)

USE: R/W (X) St. Pile (State purpose .....) ( ) Quarry/Gr. Pit ( ) Park ( ) Maint. ( ) ..... (Other)

Description prepared by Jones, March 10, 1945; Checked by Brown, March 14, 1945.

Owner Anson P. Bowen

Sage Creek–Red Butte Section, Modoc Highway.

A parcel of land lying in the S. E¼ of the N. W. ¼

of Section 33, Township 42 S., Range 47 E., W. M.,

Malheur County, Oregon, and being a portion of that tract of land described in that certain deed to Anson P. Bowen,

recorded in Book 26, Page 212 of Malheur County Records of Deeds;

the said parcel being described as follows:

Beginning at a point which is the southeast corner of the foregoing described property, said point being marked by an iron pipe and being the intersection of the northerly right of way line of the Central Pacific Ry., and the west line of Pine Ridge County Road; said point also being 40 feet distant southerly from (when measured at right angles to) the located center line of the Modoc Highway at Engineer's Station 321+03; said point also being 23.2 feet north and 460.2 feet east of the southwest corner of the Elijah Ramp D. L. C. No. 96; thence N. 68°31' W., along the northerly right of way line of the Central Pacific Ry. a distance of 494.4 feet to the west line of said D. L. C. No. 96, which line is also the west line of said property; thence N. 0°16'E. along the west line of said property, a distance of 87.22 feet to a point which is 40 feet distant northerly from (when measured at right angles to) the center line of said highway at Engineer's Station 315+75.6; thence parallel to and 40 feet distant from said center line along the arc of a spiral curve left, (the long chord of which curve bears S, 67° 56' E., 130.74 feet) a distance of 130.76 feet; thence S. 68° 31' E., parallel to said center line a distance of 41.3 feet to the west line of Pinecrest Cemetery; thence South along the west line of the said cemetery a distance of 25 feet to the southwest corner thereof; thence East along the south line of said cemetery a distance of 300 feet to the west line of said Pine Ridge County Road; thence South along the west line of said county road a distance of 178.5 feet to the point of beginning.

The parcel of land to which this description applies contains 1.13 acres, of which ---------- acres lie within the existing right of way, title to which hereby is acknowledged to be in the public, and ---------- acres lie outside of the existing right of way.

State Printing 56806

Form E-151—10M—4-52

OREGON STATE HIGHWAY DEPARTMENT

Center Line Description of Property

Purchase (X) Lease ( ) Easement ( ) R. R. Encroachment ( ) Sale ( ) ..... (Other)

USE: R/W (X) St. Pile ( ) (State purpose .....) Quarry/Gr. Pit ( ) Park ( ) Maint. ( ) ..... (Other)

Description prepared by J. M., 3-1, 19 50; Checked by A. B., 3-3, 1950

Owner Earl L. and Ella Carson

Brookings - California State Line Section, Oregon Coast Highway.

A parcel of land lying in the S. E. ¼

of Section 5, Township 41 S., Range 13 W., W. M.,

Curry County, Oregon, and being a portion of that property described in that deed

to Earl L. and Ella Carson, recorded in Book 30, Page 319,

of Curry County Records of Deeds; the said parcel being that portion of said property/ lying North of the Oregon Coast Hwy & also that part of said property included in a strip of land of variable ~~feet in~~ width, lying ~~feet~~ the southerly on/~~each~~ side of the center line of the Oregon Coast

Highway as said highway has been relocated, which center line is described as follows:

Beginning at Engineer's center line Station 807+40.95, said Station being approx.1610 feet North and 1425 feet West of the S.E. corner of said Section 5; thence S. 54° 42' E. 336.07 feet; thence on a 587.64 foot radius curve left, (the long chord of which curve bears S. 70° 35' E.) 325.81 feet to Station 314+02.83, said center line crossing the North and East lines of said property approximately at Stations 809+50 and 810+90 respectively.

(For further description turn bottom of sheet up and continue on back. Double space all notes.)

The widths in feet of the strip of land above referred to are as follows:

Station	to	Station	Width on Southerly Side of Center Line	~~Width on Side of Center Line~~
W. L. of Prop.		810+00	50	
810+00		E. L. of Prop.	90	

Bearings used herein are based upon the Oregon Co-ordinate System, South Zone.

The parcel of land to which this description applies contains 0.37 acres, of which 0.16 acres lie within the existing right of way, title to which hereby is acknowledged to be in the public, and 0.21 acres lie outside of the existing right of way.

State Printing 57105

Form E-151—10M—4-52

OREGON STATE HIGHWAY DEPARTMENT

Center Line Description of Property

Purchase (X) Lease ( ) Easement ( ) R. R. Encroachment ( ) Sale ( ) .... (Other)

USE: R/W (X) St. Pile ( ) (State purpose ....) Quarry/Gr. Pit ( ) Park ( ) Maint. ( ) .... (Other)

Description prepared by J. M., 3-1, 19 50; Checked by A. B., 3-3, 19 50

Owner Batista Pedriola et al

Brookings - California State Line Section, Oregon Coast Highway.

A parcel of land lying in the N.W. ¼, the N.E. ¼ and in the S.E. ¼ of Section 15, Township 41 S., Range 13 W., W. M., Curry County, Oregon, ~~and being a portion of that property described in that deed to~~ ...., ~~recorded in Book~~ ...., ~~Page~~ ...., ~~of~~ .... ~~County Records of Deeds~~; the said parcel being ~~that portion of said~~ .... ~~included in~~ a strip of land of variable ~~feet in~~ width, lying ~~feet~~ on the Southwesterly ~~each~~ side of the center line of the Oregon Coast Highway as said highway has been relocated (See INSERT below) ~~which center line is~~ described as follows:

Beginning at Engineer's center line Station 918+56.53, said Station being approx. 1160 feet East and 595 feet South of the N.W. corner of said Section 15; thence on a 4982.24 foot radius curve left (the long chord of which curve bears S. 47° 19' 30" E.) 933.33 feet; thence S. 52° 41' 30" E. 246.14 feet; thence on a 2604.35 foot radius curve right (the long chord of which curve bears S. 44° 58' 30" E.) 701.52 feet; thence S. 37° 15' 30" E. 419.58 feet; thence on a 3125.23 foot radius curve right (the long chord of which curve bears S. 32° 57' 30" E.) 469.1 feet; thence S. 28° 39' 30" E. 223.5 feet; thence on a 1909.86 foot radius curve left (the long chord of which curve bears S. 33° 09' 30" E.) 300 feet to Station 951+49.7, said center line crossing the extended Southerly line of said Weigel property approximately at Station 923+45. (INSERT) said strip being bounded on the Northwesterly end by the Henry J. Weigel tract (deed recorded in Book 32, Page 390) and bounded on the Southeasterly end by Alan and George Woodriff tract (deed recorded in Book 27, Page 355), said Hwy center line being

~~(For further description turn bottom of sheet up and continue on back. Double space all notes.)~~

The widths in feet of the strip of land above referred to are as follows:

Station to Station	Width on Southwesterly Side of Center Line	~~Width on .... Side of Center Line~~
918+56.53 - 920+50	40	
920+50 - 928+00	50	
928+00 - 937+00	40	
937+00 - 951+49.7	50	

Bearings used herein are based upon the Oregon Co-ordinate System, South Zone.

The parcel of land to which this description applies contains 0.96 acres, ~~of which~~ .... ~~acres lie within the existing right of way, title to which hereby is acknowledged to be in the public, and~~ .... ~~acres lie outside of the existing right of way.~~

State Printing 57105

SECTION 10. DESIGN

Article

1. Standards to be Used.
2. Spirals.
3. Run Off.
4. Superelevations.
5. Retaining Walls.
6. Footpaths to be Constructed Near Congested Districts.
7. Oil Mat Surface Treatment and Bituminous Macadam.

Article 1—Standards To Be Used

The standards for design as set forth in this section and in the AASHO policies listed below shall apply to all surveys. When the standards given in this section and the standards given in the AASHO policies differ, the instructions given in this manual shall govern.

Each year the Traffic Department publishes a revised Traffic Volume Table that includes all the information necessary for design except the turning movement and other traffic flow data necessary for intersections and interchanges. For these it will be necessary for the engineer to submit a sketch or other information defining the location and problem to the Construction Engineer, who will obtain a traffic flow diagram from the Traffic Engineer, and forward it to the Engineer with suggestions.

No deviation from the standards listed here and in the AASHO policies may be made without approval of the Division or Construction Engineer.

Copies of the following policies published by the American Association of State Highway Officials will be available in the Salem Office.

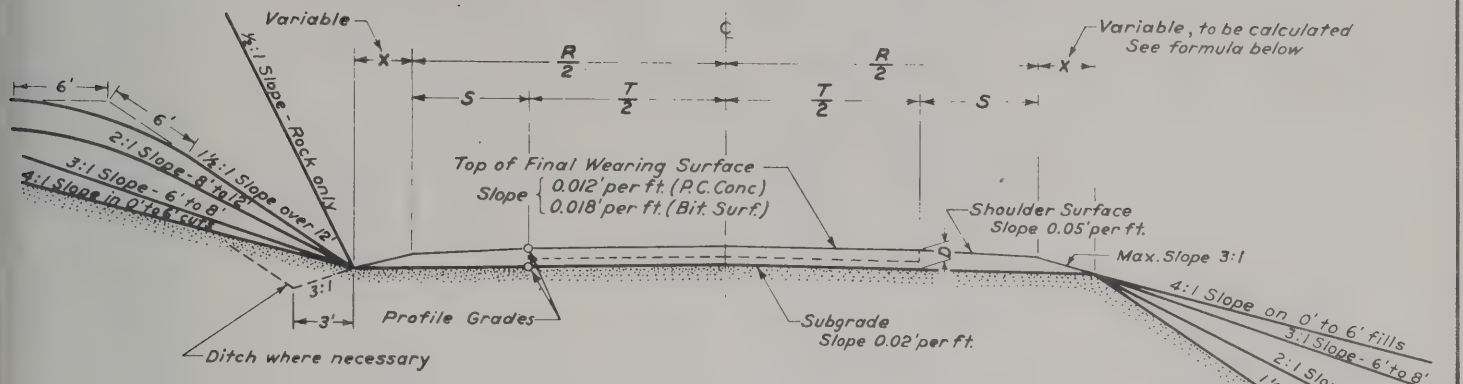
Policies On Geometric Design

1. A Policy on Highway Classifications.
2. A Policy on Highway Types (Geometric).
3. A Policy on Sight Distance for Highways.
4. A Policy on Criteria for Marking and Signing No-Passing Zone on Two and Three Lane Roads.
5. A Policy on Intersections at Grade.
6. A Policy on Rotary Intersections.
7. A Policy on Grade Separations for Intersecting Highways.
8. A Policy on Design Standards for the National System of Interstate Highways.

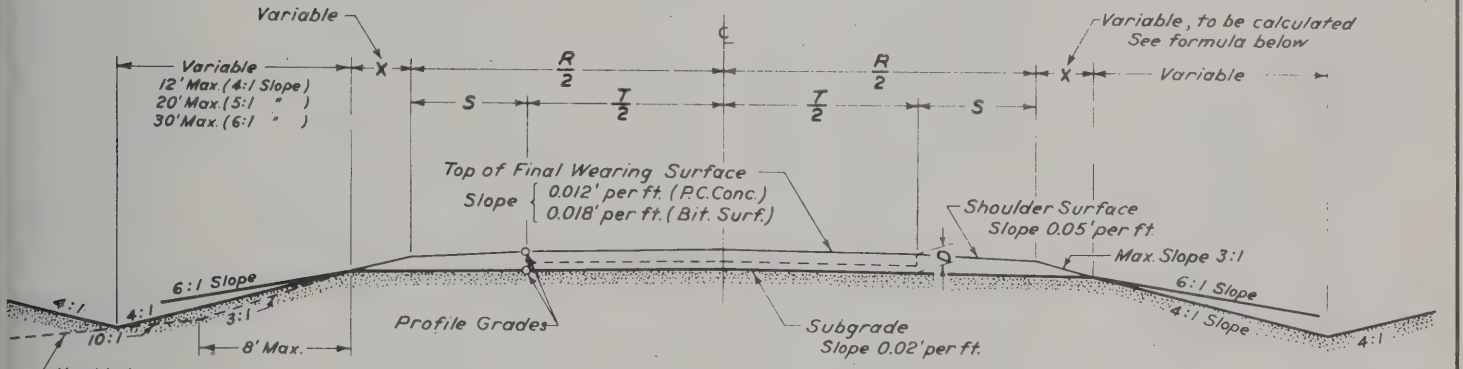
LEGEND NOTES
Legend need not be shown on plan and profile sheet unless required.
Use of expression (in place) or word "existing" is optional.
T.17S. R.3W., W.M.
ANY CITY
OREGON STATE HIGHWAY DEPARTMENT
STANDARD PLAN AND PROFILE
for use in preparing
FEDERAL AID SHEETS
AND
OTHER PLANS AND PROFILES
January-1952
Salem, Ore.
Approved
Approved
HIGH STREET - LOW STREET SECTION
ANY CITY
NAMELESS HIGHWAY
SOME COUNTY
SHEET No
X
FED. ROAD Div. No.
STATE
PROJECT NUMBER
FISCAL YEAR
TOTAL SHEETS
8
OREGON
See Index
URBAN AREAS
LEGEND
Remove Pavement or Walks
Construct New Pavement
Construct New Walks or Footpaths
Const. Monolithic Curb and Gutter
Construct Curb
Existing Curb
Const. Raised Traffic Markers
Construct Guard Rail
Existing Guard Rail
Monhole (in place)
Remove Manhole
Adjust "
Construct "
Catch Basin or Inlet (in place)
Remove Catch Basin or Inlet
Adjust " " " "
Construct " " " "
Fire Hydrant (in place)
Relocated or New Fire Hydrant
Water Valve (in place)
Water Meter (in place)
Sanitary or Storm Sewer (in place)
Const. Sanitary or Storm Sewer
Water Pipes or Mains (in place)
Relocated or New Water Pipes
Gas Mains or Pipes (in place)
Relocated or New Gas Mains
Traffic Signal Conduit or Cable
Culvert Pipe (in place)
New or Reinstalled Culvert Pipe
Construct Reinf. Conc. Box Culvert
New Siphon Pipe with Conc. End Basins
Railroad Track (in place)
Relocated or New Railroad Track
EAST BROADWAY
HIGH STREET
FERRY ST.
MILL RACE
EQUATION
Const. Catch Basin Inst. 8" Sewer Pipe 55' +88
Const Monhole with Grating Cover +45
R/W Line
Conc Bridge
Slope Easement
Const. Monolithic Curb & Gutter
Const. 5' Conc. Walks
Const. 50' Conc. Driveway
Const. 30' Conc. Driveway
Const. 12' Conc. Driveway
Const. 22' Conc. Driveway
Const. 45' Conc. Driveway
Remove 2 Catch Basins
Inst. 30" Sewer Pipe 130' with Wood Trash Rack
NOTE: If scales for Plan and Profile are any other than 1" = 100 Hor. and 10' Ver., they must be shown on each sheet.
Scale 1" = { 5' Ver. 50' Hor.
Top of Pavement at Gutter Line
Y² LINE
Yᴿ LINE
L LINE
BROADWAY
Exc. XXX
Emb. XXX
Borrow Exc. XXX
No Pay Haul
See Sheet X for Quantities
Grading included in Y² Distribution
Finished Grade 1.5 From Lt. Curb
100' V.C.
160' V.C.
0
2
88
90
95
100

OREGON STATE HIGHWAY DEPARTMENT

STANDARD ROADBED SECTIONS
FOR
TWO-LANE HIGHWAYS



TYPICAL SECTION FOR MEDIUM OR HEAVY WORK



TYPICAL SECTION FOR LIGHT WORK

CLASS OF HIGHWAY	PRESENT TRAFFIC		TRAVELED WAY WIDTH "T"	SHOULDER* WIDTH "S"	ROADWAY* WIDTH "R"
	AVERAGE DAILY	30th HIGHEST HOUR			
A	3000-5000	430-730	24'	4' or 10'	32' or 44'
B	1500-3000	215-430	22'	4' or 8'	30' or 38'
C	750-1500	110-215	20'	4' or 8'	28' or 36'
D	400 - 750	60-110	20'	4'	28'
E	100 - 400	15 - 60	20'	4'	28'
F	30 - 100	5 - 15	18'	2 or 4'	22 or 26'

*The lesser width to be used only in mountainous topography.

Subgrade width = $R + 2X$

$X = \frac{D - .035}{.313}$ increased by decimal of a foot required to result in whole feet.

D = Difference (in feet) between Top of Final Wearing Surface and Subgrade at edge of Traveled Way.

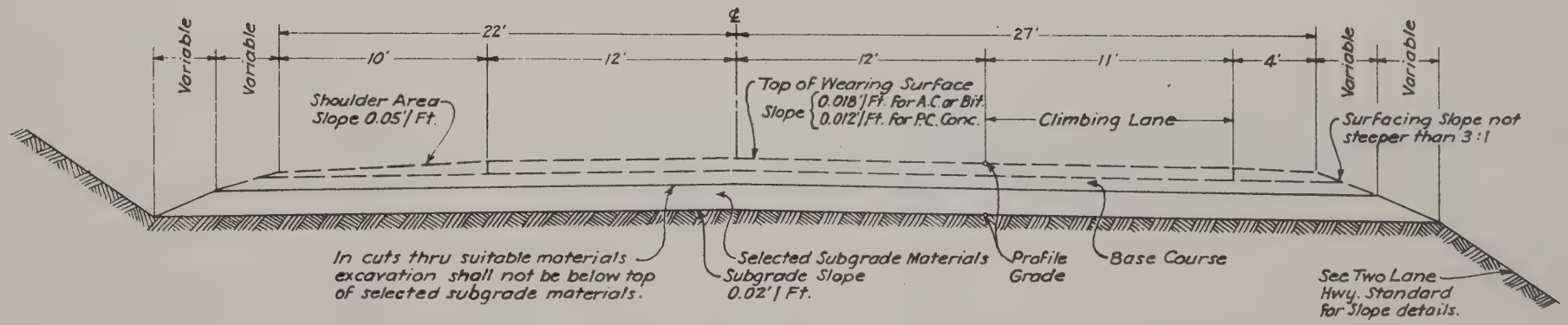
REVISED
March, 1950
January, 1953
June, 1953
November, 1953

OREGON STATE HIGHWAY DEPARTMENT

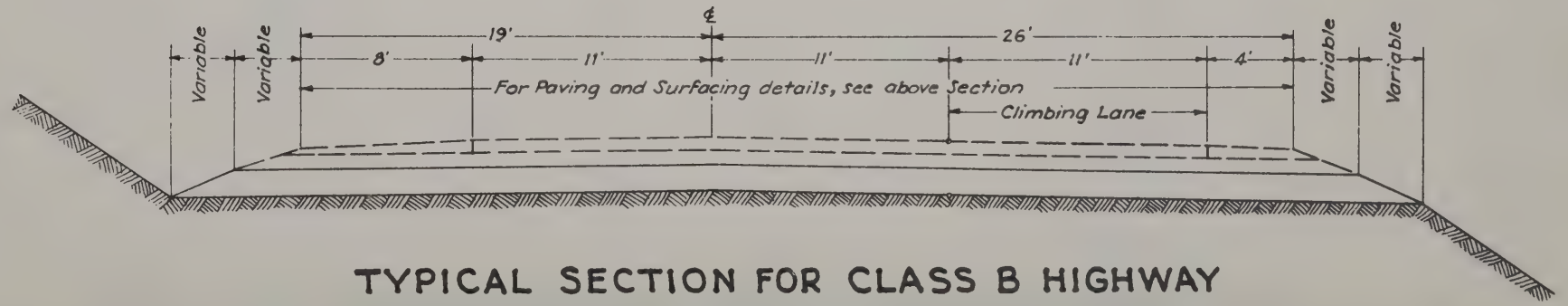
STANDARD ROADBED SECTIONS

FOR

CLIMBING LANE
ON TWO LANE HIGHWAYS



TYPICAL SECTION FOR CLASS A HIGHWAY



TYPICAL SECTION FOR CLASS B HIGHWAY

Revised

•NOTES•

Climbing Lane shall be used on grades of 3% or over, 1500 feet or more in length.
On curves, the superelevation on the Climbing Lane shall be one half of standard.

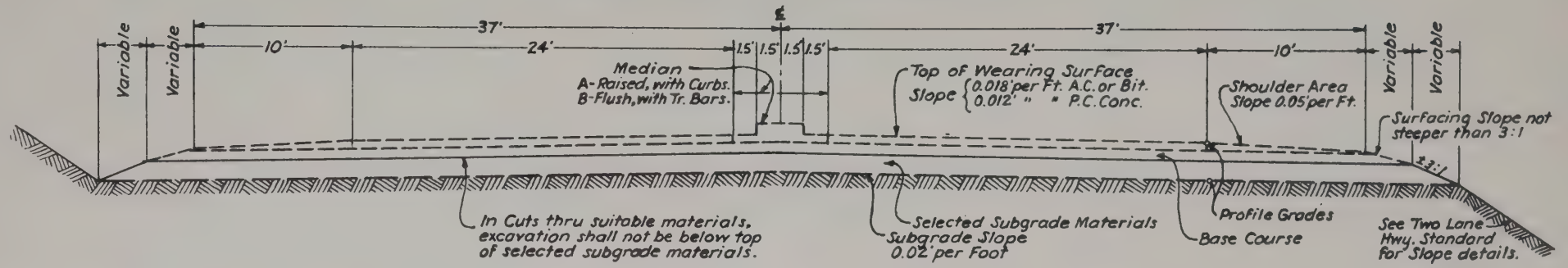
February, 1953.

OREGON STATE HIGHWAY DEPARTMENT

STANDARD ROADBED SECTIONS

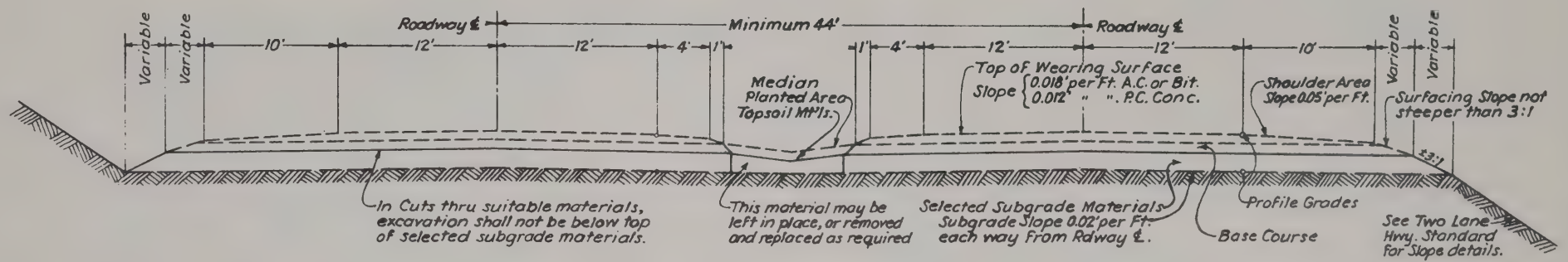
FOR

FOUR-LANE HIGHWAYS

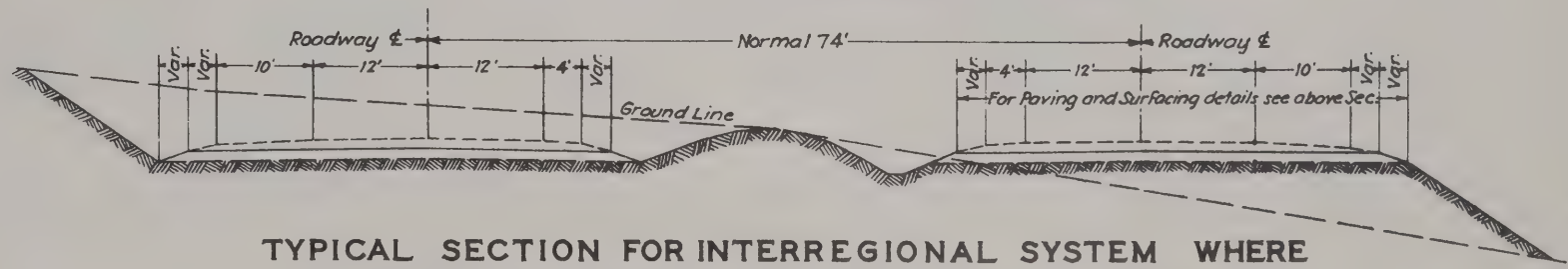


TYPICAL SECTION FOR

MOUNTAINOUS TERRAIN OR CONGESTED AREAS WHERE RIGHT OF WAY IS RESTRICTED

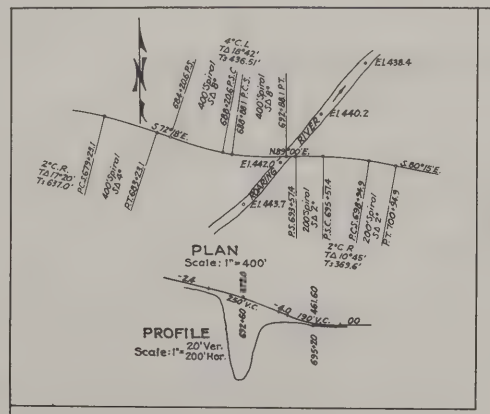


TYPICAL SECTION FOR MEDIUM WORK

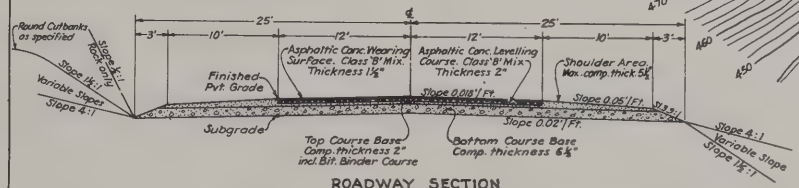


TYPICAL SECTION FOR INTERREGIONAL SYSTEM WHERE RIGHT OF WAY AND OTHER CONDITIONS PERMIT

January, 1953.

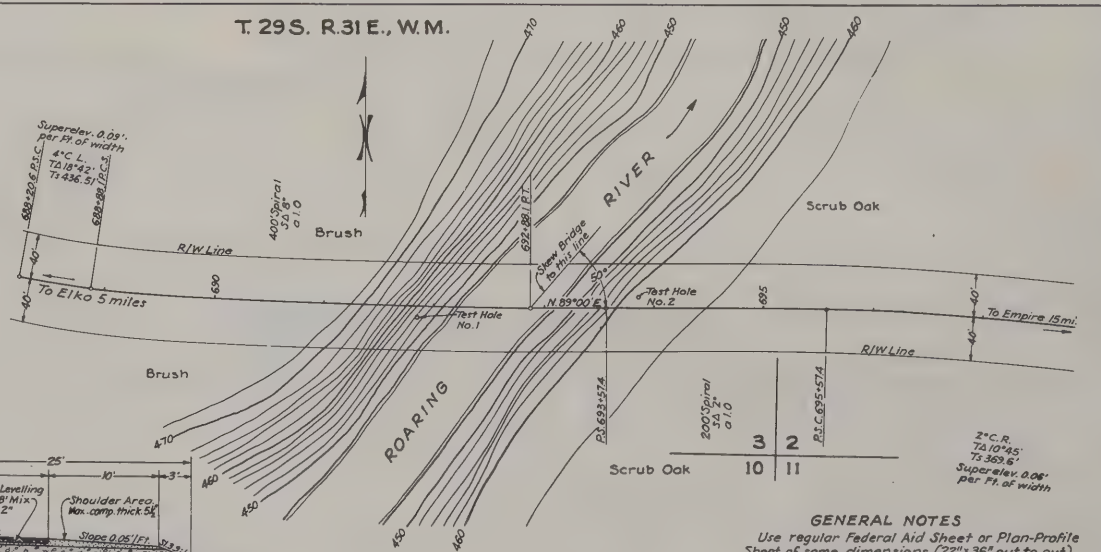


VICINITY MAP



ROADWAY SECTION AT BRIDGE SITE

T. 29 S. R. 31 E., W. M.



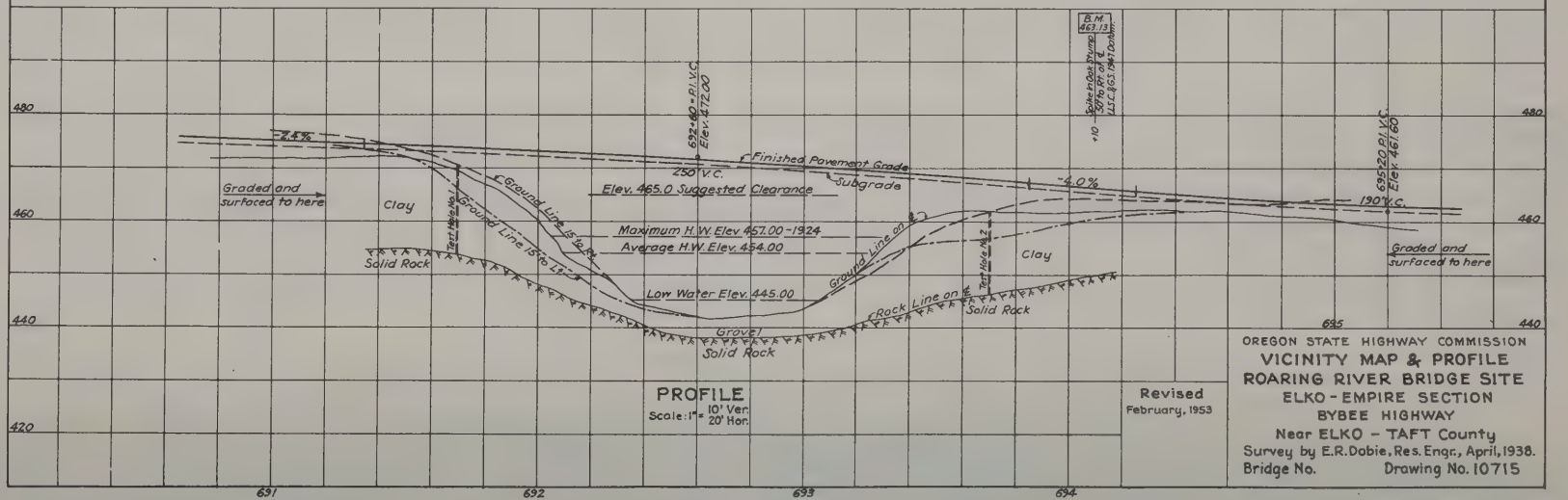
MAP
Scale: 1" = 50'

GENERAL NOTES

Use regular Federal Aid Sheet or Plan-Profile Sheet of same dimensions (22" x 36" out to out) for preparing Vicinity Map and Profile.

Data shown on this sheet is for purpose of illustration only, and all information to be Furnished is to apply to the project covered.

Bridge Number and Drawing Number to be left blank.



PROFILE
Scale: 1" = 10' Ver. 20' Hor.

Revised February, 1953

OREGON STATE HIGHWAY COMMISSION

VICINITY MAP & PROFILE

ROARING RIVER BRIDGE SITE

ELKO - EMPIRE SECTION

BYBEE HIGHWAY

Near ELKO - TAFT County

Survey by E.R. Dobie, Res. Engr., April, 1938.

Bridge No. Drawing No. 10715

Table 1

OREGON STATE HIGHWAY DEPARTMENT

Minimum Standards for Design of Highways Depending upon Traffic Density, Character of Traffic, Assumed Designed Speed and Topography. (The required sight distances are based on safe stopping distances for various speeds.)

Highway Classification: Class of Highway	Safe speed (M. P. H.)	Maximum horizontal curve permitted—degrees	Width of sub-grade—feet	Horizontal Sight Distance: Required—feet	Passing sight distance required—feet	Maximum grade 3,000 feet or under—per cent	Maximum grade 3,000 feet or over—per cent	Minimum length of vertical curves in sags
A	70	3°	44	600	2900	5	5	$L = (G - G_1)\ 100$
	60	6°	44	475	2900	6	5	
	50	10°	44	350	2900	6	5	
B	70	4°	38	600	2900	5	5	
	60	6°	38	475	2900	6	5	
	50	10°	38	350	2900	6	5	
C	70	4°	36	600	2900	5	5	
	60	6°	36	475	2900	6	6	
	50	10°	36	350	2900	6	6	
D	70	4°	28	600	2900	5	5	
	55	8°	28	425	2900	6	6	
	45	12°	28	320	2900	6	6	
E	60	6°	28	475	2900	5	5	$L = (G - G_1)\ 50$
	45	12°	28	320	2900	6	6	
	35	18°	28	235	2900	6	6	
F	45	12°	26	320	2900	6	6	
	35	18°	26	235	2900	7	7	
	20	56°	26	115	2900	7	7	

Minimum vertical sight distance required: Degree of curve	Feet
0–4°	600′
5°	545′
6°	475′
7–8°	425′
9–11°	350′
12–13°	320′
14–15°	275′
16–23°	235′
24–27°	200′
28–55°	150′
56° +	115′

In accord with the decision of the American Association of State Highway Officials, highways are now classified according to (1) traffic density, (2) character of traffic, and (3) assumed design speed. The assumed speed is further effected by the character of the topography which has a material effect upon the cost of construction.

The volume of traffic shown indicates the average maximum hour-traffic during the summer months. The speeds are indicative of the character of the topography. The first speed indicates a design for level country; the second, a design for rolling country and foothills; the third, a design for heavy mountain construction. In all cases, the curvature used must provide the requisite horizontal sight distance for the maximum safe speed on the curves by widening the inside of blind curves in accordance with Table No. 2. The vertical sight distance on curves should be the requisite amount for the safe speed of the curve in question. Locating Engineers are requested to use the maximum curves only where topography or other conditions of the terrain make the use of lighter curves too expensive. Both horizontal and vertical sight distances are the distances from the observer's eye, assumed to be 4½ feet above the pavement grade, to the last surface of pavement visible in the opposite traffic lane. Where possible passing sight distance should be increased to 3,200 feet.

EXPLANATION OF TABLE No. 1

Columns 1 and 2. Highways are classified according to traffic density shown on preceding standard for two lane highways, page 127.

The assumed design speed is expressed in miles per hour.

Three speeds in relation to the topography are shown for each classification. The highest speed contemplates a design for level country; the medium speed, a design for rolling country; and the lowest, a design for mountain country. Since the costs of construction vary with the type of topography, the variation in design standards is necessary to keep costs in some relation to the income generated by the traffic.

Column 3. This column designates the maximum degree of curve to be used for each type of country in the highway classification in question. Note that, in general, the standards for curvature have been raised, and in a few cases lowered, as compared to

former standards. The maximum curves have been adjusted to correspond with the designed speed in order to make a truly balanced design.

Column 4. This column shows the standard width of grade.

Column 5. This column gives the horizontal sight distance required to come to a stop at the maximum speed allowed by the curvature in question.

Column 6. This column shows the minimum passing sight distance, a uniform distance of 2,900 feet for all highways, based on the theory that the passing maneuver cannot be accomplished with safety save on tangents and very light curves, which normally will allow maximum speeds of 70 miles per hour at times when highways are not congested. The minimum safe-passing distance for designed speed of 70 miles per hour is 2,900 feet. When possible 3,200 feet or more should be provided.

Column 11. This column shows the vertical sight distance from the operator's eye, assumed to be 4½ feet above the pavement, to the last section of pavement visible on the verticle curve. Attention is called to the fact that this is but half of the distance usually assumed as the vertical sight distance. The values of the vertical sight distances shown are computed from the formulas shown on the accompanying sheet entitled "Sight Distances on Vertical Curves."

Sight Distance. Attention is called to two types of so-called sight distance. The nonpassing sight distance equals the distance required to bring the vehicle to a stop and is a function of the perception time and the reaction time of the operator and the braking distance of the vehicle. The nonpassing sight distance is, therefore, equal to the stopping distance. The passing sight distance equals the distance required for a safe passing maneuver. The passing sight distance is a function of the perception and reaction time of the driver, the rate of acceleration of the passing vehicle, the speed of this vehicle and of the vehicle being passed, and the assumed speed of the vehicle that may be approaching. This distance will vary over a wide range from about 600 feet to as much as 3,200 feet.

Some times the passing vehicle is required, by reason of approaching traffic, to slow down to the speed of the vehicle ahead and then to accelerate in order to attain a greater speed, to pass the vehicle. Competent drivers accelerate in second gear so as to gain speed quickly and to shorten the passing distance. At other times, when there is no approaching vehicle in sight, an immediate passing can be made in a rather short distance.

In order to arrive at a passing distance that is unquestionably safe, the assumption is made that the passing vehicle passes a single vehicle proceeding at a speed of ten miles an hour less than the designed speed of the highway. Rather long perception and reaction time is taken and the rate of acceleration of the passing vehicle is assumed to be low. The passing vehicle is presumed to slow down to the speed of the vehicle being passed then to accelerate to the design speed and to safely clear the passed vehicle and to return to the right-hand lane in time to avoid conflict with the third vehicle approaching from the opposite direction at a speed equal to the design speed of the highway. For a design speed of 70 miles per hour, this passing sight distance will vary from 2,600 to 3,200 feet, depending upon assumptions made on perception-reaction time and upon the accelerating power of the vehicle, and a sight distance of 2,900 feet has been selected for purposes of design.

One of the major factors in design is the sight distance to be provided on vertical curves particularly on tangents. Drivers sense sight impairment more on horizontal curves than on vertical curves. In the case of two approaching maximum grades over a mountain summit, it is practically impossible to get a sight distance between approaching vehicles greater than 1,200 feet which corresponds to 600 feet from eye to pavement. To provide a safe design under such conditions, the two-lane highway may be widened to a four-lane highway. This will also assist passenger cars, in congested sections, to pass around trucks on the ascending grades. In marking no-passing zones, provision has been made on the Oregon system to permit passing on vertical curves with a sight distance of 1,200 feet. While this is not absolutely safe, and the signs so indicate, many of the passings are immediate in character, which can be accomplished in a short distance, while modern automobiles can accelerate so rapidly that a delayed passing maneuver can be safely made in 1,200 feet, by such vehicles, under nearly all conditions.

Drivers are accustomed to passing on the longer vertical curves. Since no vertical curves provide a sight distance of 2,900 feet, it was considered best so to mark those vertical curves providing a sight distance of at least 1,200 feet, to permit passing, as otherwise the public might disregard the marking convention entirely and attempt passing on shorter vertical curves where extreme hazard exists.

Special attention must be given to horizontal passing sight distance in the design of all highways and these clear passing places should be located at frequent intervals and shown on the plans. On any class of highway the safe-passing distances remain the same, but they should be provided at more frequent intervals on the higher type roads. The spacing of safe-passing places obviously will vary and is affected by the location of horizontal curves and the spacing of vertical curves. This safe-passing feature is extremely important and must be borne in mind in designing all highways.

Since the design depends mainly upon speed, and since speed is controlled by curvature, it is assumed that few, if any, of the vehicles will travel at speeds greater than the design speed of the curves. Speed checks indicate that the major portion of the vehicles travel at speeds not to exceed 0.7 of the design speed. To be on the safe side, the stopping sight distance both horizontal and vertical should be provided in accordance with the design speed of the curve when the section of road is on a curve. On tangents, the stopping sight distance on vertical curves should be provided for 70 miles per

hour. Sections affording the required passing sight distance should be provided as frequently as feasibly possible. In the case of mountain summits, where the speed over a section is largely limited to 50 miles per hour due to the use of maximum curvature, studies should be made to use the shorter vertical curve providing safe stopping distance for the designed speed in question and to widen the roadbed over the summit to four lanes of pavement to afford safe passing, in contrast to a provision for a minimum of 1,200 feet vertical sight distance between approaching vehicles, which provides a passing sight distance inadequate to meet all conditions and which does not permit the free flow of traffic that the four-lane facility will afford. Cost studies of these alternates should be submitted by the Division Engineer to the Construction Engineer for his review and final instructions.

On two-lane highways it is desirable to build a third lane on grades to allow average traffic to pass that which is slowed by reason of the grade. In general they should be installed on highways carrying an average daily traffic of 1,500 cars on grades of 3% or more and lengths of 1,500 feet or over. The point of beginning should normally be at that place on the approach vertical curve where the rate of grade is a plus two per cent. The passing lane should be carried over the summit of the grade to the end of the vertical or 1,000 feet beyond the point of level grade, whichever is longer. The above limits are exclusive of the transitions which should each be 400 feet long. On curves of one degree or more the superelevation of the climbing lane shall be one-half the standard superelevation.

In cases where grades are 3% or over and break to flatter grades, but which are still ascending, special study should be made and the problem discussed with the Division Engineer.

Each engineer responsible for location and design must familiarize himself with these instructions and follow them in all cases unless specifically authorized to violate them.

SPEED CHART

SAFE SPEED FORMULA, $V = \sqrt{\frac{R(s+f)}{0.067}}$

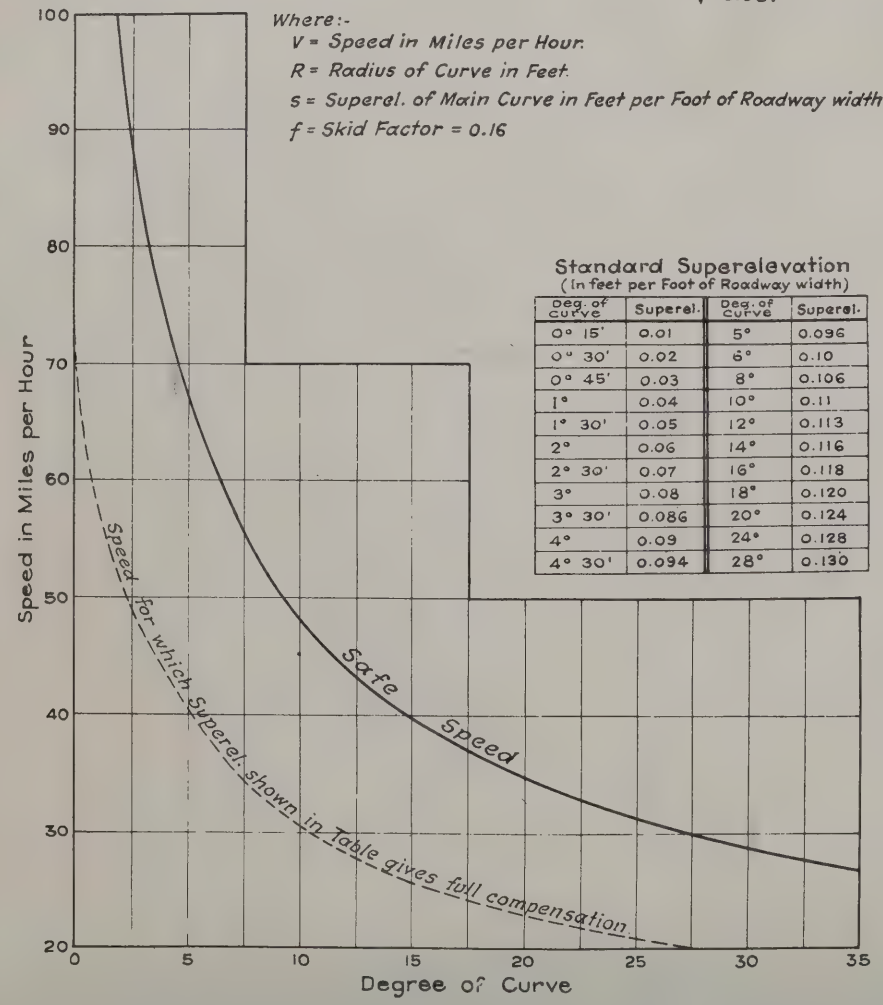
Where:-

V = Speed in Miles per Hour.

R = Radius of Curve in Feet.

s = Superel. of Main Curve in Feet per Foot of Roadway width.

f = Skid Factor = 0.16



Standard Superelevation
(in feet per Foot of Roadway width)

Deg. of curve	Superel.	Deg. of curve	Superel.
0° 15'	0.01	5°	0.096
0° 30'	0.02	6°	0.10
0° 45'	0.03	8°	0.106
1°	0.04	10°	0.11
1° 30'	0.05	12°	0.113
2°	0.06	14°	0.116
2° 30'	0.07	16°	0.118
3°	0.08	18°	0.120
3° 30'	0.086	20°	0.124
4°	0.09	24°	0.128
4° 30'	0.094	28°	0.130

Revised Aug., 1938

TABLE Nº2
HORIZONTAL SIGHT DISTANCE

Sight points established by line tangent to face of cut bank 4.5 feet above elevation of grade and distance measured along ℄ of Highway

DESIGNED SPEED* M.P.H.	DEGREE OF CURVATURE	RADIUS OF CURVATURE FT.	AVAILABLE HORIZONTAL SIGHT DISTANCE (FT.)*** DISTANCE "m", FROM CENTER LINE OF HIGHWAY TO FACE OF CUT								MIN. SIGHT DISTANCE REQUIRED FOR STOPPING FT.
			29.5	27.5	25.5	23.5	21.5	19.5	17.5	15.5	
70	2°	2864.8	823	798	765	733	701	669	633	597	600**
70	3°	1909.9	673	650	625	600	573[2.0]	547[4.0]	517[6.0]	487[8.0†]	600
70	4°	1432.4	583[1.0]	562[3.0]	541[5.0]	520[7.0]	497[9.0]	473[11.0]	448[13.0]	422[15.0]	600
65	5°	1145.9	521[2.0]	503[4.0]	484[6.0]	465[8.0]	445[10.0]	423[12.0]	401[14.0]	377[16.0]	540
60	6°	954.9	476	459[2.0]	442[4.0]	424[6.0]	406[8.0]	387[10.0]	366[12.0]	341[14.0]	475
55	7°	818.5	441	426	410[2.0]	394[4.0]	377[6.0]	358[8.0]	339[10.0]	320[12.0]	425
55	8°	716.2	413[2.0]	398[4.0]	383[6.0]	368[8.0]	352[10.0]	335[12.0]	317[14.0]	299[16.0]	425
50	9°	636.6	389	376	363	347	332[2.0]	316[4.0]	299[6.0]	282[8.0]	350
50	10°	573.0	368	356	344[1.0]	330[3.0]	315[5.0]	300[7.0]	284[9.0]	267[11.0]	350
45	12°	477.5	336	325	314[1.0]	303[3.0]	288[5.0]	274[7.0]	259[9.0]	245[11.0]	320
40	14°	409.3	313	302	290	278	266[2.0]	254[4.0]	240[6.0]	226[8.0]	275
35	16°	358.1	292	282	272	261	249	237	225[2.0]	211[4.0]	235
35	18°	318.3	276	267	257	246	235	224[2.0]	212[4.0]	200[6.0]	235
35	20°	286.5	262	253	244	234	223[2.0]	213[4.0]	201[6.0]	189[8.0]	235
30	24°	238.7	240	231	223	214	204	194[1.0]	184[3.0]	173[5.0]	200
25	28°	204.6	223	215	206	198	189	180	171	160	150
20	56°	102.3	159	153	147	141	135	128	121	114	115

*Based on Speed Formula: $V = \sqrt{\frac{R(e+f_1)}{0.067}}$

V = Speed in M.P.H.
e = Max. superelevation = 0.1 ft. per ft.
f_1 = Coef. of side skid friction = 0.16

Speed shown to nearest 5 M.P.H. No speed in excess of 70 M.P.H. considered.

**From Stopping Distance Formula:

$$S_h = \frac{V^2}{30(f_2 \pm G)} + 1.47\ PRT\ V$$

S_h = Sight distance req'd. for stopping, ft.
V = Designed speed in M.P.H.
f_2 = Coef. of straight skid friction = 0.5
G = Grade expressed as ±0.03
PRT = Perception reaction time = 2½ sec.

***Sight distance based on formula: $S_h = \frac{200 \cos^{-1}\frac{R-m}{R}}{D}$

S_h = Available sight distance, ft.
R = Radius of curvature of Hwy. ℄, ft.
m = Offset (ft.) from ℄ Hwy. to face of 1:1 cut slope 4.5' above road surface
D = Degree of curve expressed in degrees
Arc $\cos\frac{R-m}{R}$ expressed in degrees

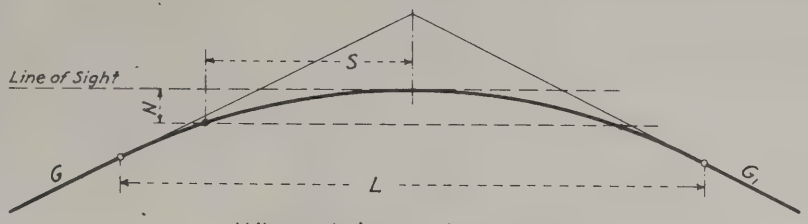
†Small figures show additional widening of cut necessary to make available sight distance equal distance required for stopping.

7-22-'38
8-1-'30

OREGON STATE HIGHWAY DEPARTMENT

SIGHT DISTANCE ON VERTICAL CURVES

$G - G_1$ = Algebraic Difference in Grades.
S = Sight Distance in stations.
N = Height of Operators eyes above road surface (in feet).
L = Length of Vertical Curve in Stations.



Where L is greater than S

$$S = \sqrt{\frac{2NL}{G-G_1}} \qquad L = \frac{S^2(G-G_1)}{2N} \qquad G-G_1 = \frac{2NL}{S^2}$$

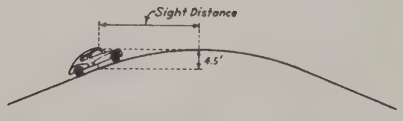
Where L is less than S

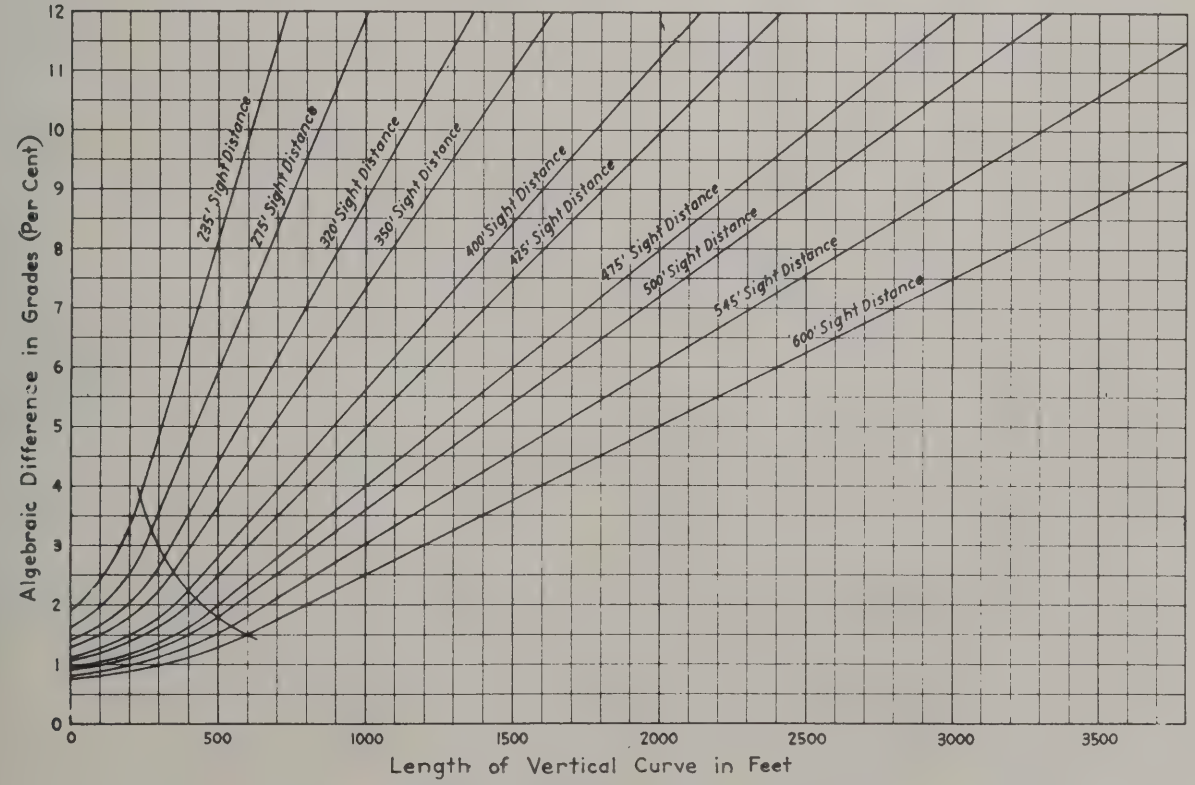
$$S = \frac{L}{2} + \frac{N}{G-G_1} \qquad L = 2\left(S - \frac{N}{G-G_1}\right) \qquad G-G_1 = \frac{N}{S - \frac{L}{2}}$$

OREGON STATE HIGHWAY DEPARTMENT

SIGHT DISTANCE ON VERTICAL CURVES

Vision Point assumed as being 4.5 ft. above Road Surface





Article 2—Spirals

All curves shall be spiraled, using the Talbot Spiral based on the arc definition for radius of curve. The standard length for spirals shall be as follows:

Degree of Curve	*Value of "a"*	*Length*
0°15′	0.1	250′
0°16′ to 0°29′	0.1	*.....
0°30′	0.2	250′
0°31′ to 0°59′	0.2	
1°00′	0.25	400′
1°01′ to 1°29′	0.25	
1°30′	0.4	375′
1°31′ to 1°59′	0.4	
2°	0.5	400′
2°01′ to 2°59′	0.5	
3°00′	0.5	600′
3°01′ to 3°29′	0.6	
3°30′	0.7	500′
3°31′ to 3°59′	0.7	
4°00′	0.8	500′
4°01′ to 4°59′	0.8	
5°00′	1.0	500′
5°01′ to 5°59′	1.0	
6°00′	1 ⅓	450′
6°01′ to 6°59′	1 ⅓	
7°00′	1.75	400′
7°01′ to 7°59′	1.75	
8°00′	2.0	400′
8°01′ to 9°59′	2.0	
10°00′	2.5	400′
10°01′ to 11°59′	2.5	
12°00′	3.0	400′
12°01′ to 13°59′	3.0	
14°00′	4.0	350′
14°01′ to 15°59′	4.0	
16°00′	5.0	320′
16°01′ to 17°59′	5.0	
18°00′	6.0	300′
18°01′ to 19°59′	6.0	
20°00′	8.0	250′
20°01′ to 23°59′	8.0	
24°	10.0	240′
24°01′ to 29°59′	10.0	
30°00′	15.0	200′
30°01′ to 35°59′	15.0	
36°00′	20.0	180′
36°01′ to 39°59′	20.0	
40°	25.0	160′
Above 40°	25.0	

* Variable in proportion to degree.

Longer spirals than the above standard may be used at any time wherever advantage in their use is apparent, but shorter spirals may only be used in exceptional cases and by special authority.

Double spirals may not be used, and the minimum length of simple curve between spirals shall be 50 feet.

Compound curves should be avoided if possible, but in cases where they have been authorized spirals shall be used between the parts of the compound as well as on the end of the curve. The length of spiral between the parts of a compound curve shall not be less than in proportion to the standard length of spiral for the particular curves as the difference in the degree of the parts of the compound curve is to the degree of the sharper part of the compound.

Article 3—Run-off

Run-off shall be calculated as a straight grade of the same length and coinciding with the spiral, with the ends being joined to the normal grade line by vertical curves one hundred feet long.

On curves turning in opposite directions and which are true reversing or are separated by tangents of four hundred feet or less, the run-offs of the two curves shall be combined in such a way that there will be no dip in the center line grade between the two curves. The run-offs shall run from the point of maximum superelevation on one curve to the profile grade at a point opposite the point of maximum superelevation on the other curve.

In special cases, such as intersections or at point of absolute control, special design may be worked out with the aid of a three-line profile. These standards may also be varied in cases where the curves do not meet our present standards for alignment, but only where absolutely necessary.

In the design of run-offs on pavements, the three-line profile shall be used in all cases as a check, and particular attention given to the effect produced by adjacent grade breaks in the normal profile.

Article 4—Superelevations

Except as noted below, superelevation shall be obtained by raising the center and outside edge of the roadbed, and lowering the inside edge, holding at profile grade on two-lane roadways that line of the roadbed surface that is at the inner edge of the pavement as indicated on the typical sections.

This rule will be subject to the following exceptions:

(a) On grades of four per cent or over, the profile grade shall be carried at the edge of the pavement to the right of the center line ascend-

ing the grade and the superelevation obtained by raising the center and left side of the roadway on curves turning to the right going up hill, and by lowering the center and left side of the roadway on curves turning to the left.

(b) On grade summits where the rate of grade is great enough to avoid adverse grades on the run-off, the superelevation shall be obtained by carrying the profile grade outside the center line and by lowering the center and inside of the curve.

On four lane pavements where opposing lanes are separated by a median strip of 20 feet or more the superelevation on one two lane strip may be independent of that on the other and shall follow rules for two lane pavements as closely as possible. In cases where the median strip is 20 feet or more separate grade lines may be established and opposing strips treated as independent two lane roads, care being taken that the slope of the median strip, exclusive of shoulders and drainage, be not more than 1½ to 1.

In cases where less than 200 feet of main curve is left after spiraling, the superelevation along the main curve shall be determined by joining the run-offs in the center of the curve by a vertical curve of not less than 200 feet, nor more than enough to bring the superelevation to the maximum permitted for each particular curve.

(See Section 11, Article 11(f) for superelevation on bridges.)

STANDARD SUPERELEVATIONS IN FEET FOR VARIOUS WIDTHS OF SURFACING OR ROADBED

Degree of Curve	*Rate (Ft.) per Ft. of Width*	*Width of Roadbed in Feet*																					
		18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
0° to 0°22′	0.010	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6
0°23′ to 0°37′	0.020	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.2	1.2
0°38′ to 0°52′	0.030	0.5	0.6	0.7	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.6	1.7	1.7	1.8
0°53′ to 1°14′	0.040	0.7	0.8	0.9	1.0	1.0	1.1	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.2	2.3	2.4
1°15′ to 1°44′	0.050	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
1°45′ to 2°14′	0.060	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.9	2.0	2.2	2.3	2.4	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.4	3.5	3.6
2°15′ to 2°44′	0.070	1.3	1.4	1.5	1.7	1.8	2.0	2.1	2.2	2.4	2.5	2.7	2.8	2.9	3.1	3.2	3.4	3.5	3.6	3.8	3.9	4.1	4.2
2°45′ to 3°14′	0.080	1.4	1.6	1.8	1.9	2.1	2.2	2.4	2.6	2.7	2.9	3.0	3.2	3.4	3.5	3.7	3.8	4.0	4.2	4.3	4.5	4.6	4.8
3°15′ to 3°44′	0.086	1.5	1.7	1.9	2.1	2.2	2.4	2.6	2.8	2.9	3.1	3.3	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.6	4.8	5.0	5.2
3°45′ to 4°14′	0.090	1.6	1.8	2.0	2.2	2.3	2.5	2.7	2.9	3.1	3.2	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.7	4.9	5.0	5.2	5.4
4°15′ to 4°44′	0.094	1.7	1.9	2.1	2.3	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	3.9	4.1	4.3	4.5	4.7	4.9	5.1	5.3	5.5	5.6
4°45′ to 5°29′	0.096	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1	3.3	3.5	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8
5°30′ to 6°59′	0.100	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0
7°00′ to 8°59′	0.106	1.9	2.1	2.3	2.5	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.5	4.7	4.9	5.1	5.3	5.5	5.7	5.9	6.1	6.4
9°00′ to 10°59′	0.110	2.0	2.2	2.4	2.6	2.9	3.1	3.3	3.5	3.7	4.0	4.2	4.4	4.6	4.8	5.1	5.3	5.5	5.7	5.9	6.2	6.4	6.6
11°00′ to 12°59′	0.113	2.0	2.3	2.5	2.7	2.9	3.2	3.4	3.6	3.8	4.1	4.3	4.5	4.7	5.0	5.2	5.4	5.6	5.9	6.1	6.3	6.6	6.8
13°00′ to 15°59′	0.116	2.1	2.3	2.6	2.8	3.0	3.2	3.5	3.7	3.9	4.2	4.4	4.6	4.9	5.1	5.3	5.6	5.8	6.0	6.3	6.5	6.7	7.0
16°00′ to 19°59′	0.120	2.2	2.4	2.6	2.9	3.1	3.4	3.6	3.8	4.1	4.3	4.6	4.8	5.0	5.3	5.5	5.8	6.0	6.2	6.5	6.7	7.0	7.2
20°00′ to 23°59′	0.124	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2	4.5	4.7	5.0	5.2	5.5	5.7	6.0	6.2	6.4	6.7	6.9	7.2	7.4
24°00′ to 27°59′	0.128	2.3	2.6	2.8	3.1	3.3	3.6	3.8	4.1	4.4	4.6	4.9	5.1	5.4	5.6	5.9	6.1	6.4	6.7	6.9	7.2	7.4	7.7
28°00′ Up	0.130	2.3	2.6	2.9	3.1	3.4	3.6	3.9	4.2	4.4	4.7	4.9	5.2	5.5	5.7	6.0	6.2	6.5	6.8	7.0	7.3	7.5	7.8

Article 5—Retaining Walls

Our standard plans for retaining walls are intended only as a rough indication of the quantities which are ordinarily necessary and should only be used for approximate estimates. Retaining wall design is affected by surface conditions, drainage conditions, character of backfill, etc., and each individual location merits individual study.

Resident Engineers shall submit complete vicinity maps for each wall contemplated.

No wall shall be constructed except upon approved design by the bridge department and arrangement will be made by that department for usual inspection during construction.

Article 6—Footpaths to be Built Near Congested Districts

It is suggested that wherever feasible footpaths be included on all projects in the vicinity of towns, schools or thickly settled communities. These paths should be treated as a part of the highway location. Therefore, Location Engineers will show a definite location and design for footpaths on the location maps and profile. One path will be considered standard, but two may be used in close proximity to towns. The pathway should be four feet wide with a wearing surface of crushed rock and gravel. It is advisable to first place a lower course of 1¼" to ¾" rock of 2-inch depth, with a top course of ¼"-0" rock of 1-inch thickness.

Paths if possible should be distinctly separate

from the highway grade to give safety to the pedestrians. Straight lines should be avoided in order that the paths blend in with the roadside shrubbery. It is unnecessary to use a uniform grade line as paths can follow closely the ground contour over moderately rolling ground. Where the cuts and fills are very high it will be necessary to carry the path along the shoulder.

Article 7—Oil Mat Surface Treatment and Bituminous Macadam

The chart *"Table of Details"* for Oil Mat Surface Treatment and Bituminous Macadam and the table of "Calculation Data for Preparing Surfacing, Oiling and Paving Estimates on Normal Projects" shall be used for estimating purposes.

TONS OF CLASS "A" OR "B" ASPHALTIC CONCRETE

Based on .00608 Tons per Sq. ft. (1" Thick.)

Tons Per Station

Thickness Inches	WIDTH IN FEET 10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	36'	48'
1	6.080	7.296	8.512	9.728	10.944	12.160	13.376	14.592	15.808	17.024	18.240	21.888	29.184
1½	9.120	10.944	12.768	14.592	16.416	18.240	20.064	21.888	23.712	25.536	27.360	32.832	43.776
2	12.160	14.592	17.024	19.456	21.888	24.320	26.752	29.184	31.616	34.048	36.480	43.776	58.368
2½	15.200	18.240	21.280	24.320	27.360	30.400	33.440	36.480	39.520	42.560	45.600	54.720	72.960
3	18.240	21.888	25.536	29.184	32.832	36.480	40.128	43.776	47.424	51.072	54.720	65.664	87.552
3½	21.280	25.536	29.792	34.048	38.304	42.560	46.816	51.072	55.328	59.584	63.840	76.608	102.144
4	24.320	29.184	34.048	38.912	43.776	48.640	53.504	58.368	63.232	68.096	72.960	87.552	116.736
4½	27.360	32.832	38.304	43.776	49.248	54.720	60.192	65.664	71.136	76.608	82.080	98.496	131.328
5	30.400	36.480	42.560	48.640	54.720	60.800	66.880	72.960	79.040	85.120	91.200	109.440	145.920
5½	33.440	40.128	46.816	53.504	60.192	66.880	73.568	80.256	86.944	93.632	100.320	120.384	160.512
6	36.480	43.776	51.072	58.368	65.664	72.960	80.256	87.552	94.848	102.144	109.440	131.328	175.104

Tons Per Mile

1	321	385	449	514	578	642	706	770	835	899	963	1156	1541
1½	482	578	674	770	867	963	1059	1156	1252	1348	1445	1734	2311
2	642	770	899	1027	1156	1284	1413	1541	1669	1798	1926	2311	3082
2½	803	963	1124	1284	1445	1605	1766	1926	2087	2247	2408	2889	3852
3	963	1156	1348	1541	1734	1926	2119	2311	2504	2697	2889	3467	4623
3½	1124	1348	1573	1798	2022	2247	2472	2697	2921	3146	3371	4045	5393
4	1284	1541	1798	2055	2311	2568	2825	3082	3339	3595	3852	4623	6164
4½	1445	1734	2022	2311	2600	2889	3178	3467	3756	4045	4334	5201	6934
5	1605	1926	2247	2568	2889	3210	3531	3852	4173	4494	4815	5778	7705
5½	1766	2119	2472	2825	3178	3531	3884	4238	4591	4944	5297	6356	8475
6	1926	2311	2697	3082	3467	3852	4238	4623	5008	5393	5778	6934	9245

SQUARE YARDS OF SURFACE AND CUBIC YARDS OF VOLUME PER 100 FEET & PER MILE

Width in Feet	Number of Square Yds.		Number of Cubic Yards for Different Depths, Lengths and Widths.																					
			1 In. Deep (Constant)		2 In. Deep		3 In. Deep		4 In. Deep		5 In. Deep		6 In. Deep		7 In. Deep		8 In. Deep		9 In. Deep		10 In. Deep		11 In. Deep		12 In. Deep	
	100 Ft.	1 Mile	100 Ft.	1 Mile	100 Ft.	1 Mile	100 Ft.	1 Mile	100 Ft.	1 Mile	100 Ft.	1 Mile	100 Ft.	1 Mile	100 Ft.	1 Mile	100 Ft.	1 Mile	100 Ft.	1 Mile	100 Ft.	1 Mile	100 Ft.	1 Mile	100 Ft.	1 Mile
1	11.11	587	0.30864	16.2963	0.62	33	0.93	49	1.23	65	154	81	1.85	98	2.16	114	2.47	130	2.78	147	3.09	163	3.40	179	3.70	196
2	22.22	1173	0.61728	32.5926	1.23	65	1.85	98	2.47	130	3.09	163	3.70	196	4.32	228	4.94	261	5.56	293	6.17	326	6.79	359	7.41	391
3	33.33	1760	0.92592	48.8889	1.85	98	2.78	147	3.70	196	4.63	244	5.56	293	6.48	342	7.41	391	8.33	440	9.26	489	10.19	538	11.11	587
4	44.44	2347	1.23456	65.1852	2.47	130	3.70	196	4.94	261	6.17	326	7.41	391	8.64	456	9.88	521	11.11	587	12.35	652	13.58	717	14.81	782
5	55.56	2933	1.54320	81.4815	3.09	163	4.63	244	6.17	326	7.72	407	9.26	489	10.80	570	12.35	652	13.89	733	15.43	815	16.98	896	18.52	978
6	66.67	3520	1.85184	97.7778	3.70	196	5.56	293	7.41	391	9.26	489	11.11	587	12.96	684	14.81	782	16.67	880	18.52	978	20.37	1076	22.22	1173
7	77.78	4107	2.16048	114.0741	4.32	228	6.48	342	8.64	456	10.80	570	12.96	684	15.12	799	17.28	913	19.44	1027	21.60	1141	23.77	1255	25.93	1369
8	88.89	4693	2.46912	130.3704	4.94	261	7.41	391	9.88	521	12.35	652	14.81	782	17.28	913	19.75	1043	22.22	1173	24.69	1304	27.16	1434	29.63	1564
9	100.00	5280	2.77776	146.6667	5.56	293	8.33	440	11.11	587	13.89	733	16.67	880	19.44	1027	22.22	1173	25.00	1320	27.78	1467	30.56	1613	33.33	1760
10	111.11	5867	3.08641	162.9630	6.17	326	9.26	489	12.35	652	15.43	815	18.52	978	21.60	1141	24.69	1304	27.78	1467	30.86	1630	33.95	1793	37.04	1956
12	133.33	7040	3.70369	195.5556	7.41	391	11.11	587	14.81	782	18.52	978	22.22	1173	25.93	1369	29.63	1564	33.33	1760	37.04	1956	40.74	2151	44.44	2347
14	155.56	8213	4.32097	228.1482	8.64	456	12.96	684	17.28	913	21.60	1141	25.93	1369	30.25	1597	34.57	1825	38.89	2053	43.21	2281	47.53	2510	51.85	2738
15	166.67	8800	4.62961	244.4445	9.26	489	13.89	733	18.52	978	23.15	1222	27.78	1467	32.41	1711	37.04	1956	41.67	2200	46.30	2444	50.93	2689	55.56	2933
16	177.78	9387	4.93826	260.7408	9.88	521	14.81	782	19.75	1043	24.69	1304	29.63	1564	34.57	1825	39.51	2086	44.44	2347	49.38	2607	54.32	2868	59.26	3129
18	200.00	10560	5.55554	293.3334	11.11	587	16.67	880	22.22	1173	27.78	1467	33.33	1760	38.89	2053	44.44	2347	50.00	2640	55.56	2933	61.11	3227	66.67	3520
20	222.22	11733	6.17282	325.9260	12.35	652	18.52	978	24.69	1304	30.86	1630	37.04	1956	43.21	2281	49.38	2607	55.56	2933	61.73	3259	67.90	3585	74.07	3911
22	244.44	12907	6.79010	358.5186	13.58	717	20.37	1076	27.16	1434	33.95	1793	40.74	2151	47.53	2510	54.32	2868	61.11	3227	67.90	3585	74.69	3944	81.48	4302
24	266.66	14080	7.40738	391.1112	14.81	782	22.22	1173	29.63	1564	37.04	1956	44.44	2347	51.85	2738	59.26	3129	66.67	3520	74.07	3911	81.48	4302	88.89	4693
26	288.89	15253	8.02467	423.7038	16.05	847	24.07	1271	32.10	1695	40.12	2119	48.15	2542	56.17	2966	64.20	3390	72.22	3813	80.25	4237	88.27	4661	96.30	5084
28	311.11	16427	8.64195	456.2964	17.28	913	25.93	1369	34.57	1825	43.21	2281	51.85	2738	60.49	3194	69.14	3650	77.78	4107	86.42	4563	95.06	5019	103.70	5476
30	333.33	17600	9.25923	488.8890	18.52	978	27.78	1467	37.04	1956	46.30	2444	55.56	2933	64.81	3422	74.07	3911	83.33	4400	92.59	4889	101.85	5378	111.11	5867
32	355.56	18773	9.87651	521.4816	19.75	1043	29.63	1564	39.51	2086	49.38	2607	59.26	3129	69.13	3650	79.01	4172	88.89	4693	98.76	5215	108.64	5736	118.52	6258
34	377.78	19947	10.49379	554.0742	20.99	1108	31.48	1662	41.98	2216	52.47	2770	62.96	3324	73.46	3879	83.95	4433	94.44	4987	104.94	5541	115.43	6095	125.93	6649
36	400.00	21120	11.11108	586.6668	22.22	1173	33.33	1760	44.44	2347	55.56	2933	66.67	3520	77.78	4107	88.89	4693	100.00	5280	111.11	5867	122.22	6453	133.33	7040
38	422.22	22293	11.72836	619.2594	23.46	1239	35.18	1858	46.91	2477	58.64	3096	70.37	3716	82.10	4335	93.83	4954	105.55	5573	117.28	6193	129.01	6812	140.74	7431
40	444.44	23467	12.34564	651.8520	24.69	1304	37.04	1956	49.38	2607	61.73	3259	74.07	3911	86.42	4563	98.77	5215	111.11	5867	123.46	6519	135.80	7170	148.15	7822
42	466.67	24640	12.96292	684.4446	25.93	1369	38.89	2053	51.85	2738	64.81	3422	77.78	4107	90.74	4791	103.70	5476	116.67	6160	129.63	6844	142.59	7529	155.55	8213
44	488.89	25813	13.58020	717.0372	27.16	1434	40.74	2151	54.32	2868	67.90	3585	81.48	4302	95.06	5019	108.64	5736	122.22	6453	135.80	7170	149.38	7887	162.96	8604
46	511.11	26987	14.19749	749.6298	28.39	1499	42.59	2249	56.79	2999	70.99	3748	85.18	4498	99.38	5247	113.58	5997	127.77	6747	141.97	7496	156.17	8246	170.37	8996

J. Rhodes 9-10-44

CALCULATION DATA FOR PREPARING SURFACING, OILING AND PAVING ESTIMATES ON NORMAL PROJECTS

Item	*Unit*	*Calculated Quantity*	*Compaction Allowance*							
Rock										
Uncrushed rock or gravel	C. Y.	X-Sec. Vol.	+ 25%	Equals	Summery Net	+ 10%	Equals	Summary	Gross	
Crushed rock or gravel	"	X-Sec. Vol.	+ 30%	"	"	+ 10%	"	"	"	
Coarse Rock (Keyed Base)	"	X-Sec. Vol.	+ 10%	"	"	+ 10%	"	"	"	
Key Rock (Keyed Base)	"	½X-Sec. Vol. of Coarse Rock		"	"	+ 10%	"	"	"	
Sprinkling										
a. Uncrushed material	M Gal.	.020 per C. Y.		Equals	Summery Net	+ 10%	Equals	Summary	Gross	
b. Crushed material	"	.025 per C. Y.		"	"	+ 10%	"	"	"	
c. Keyed rock base	"	.030 per C. Y.		"	"	+ 10%	"	"	"	
Mineral Aggregate	C.Y.	*Table Value		"	"	+ 5%	"	"	"	
Bituminous Cement	Ton	" "		"	"	+ 10%	"	"	"	
Asphaltic Concrete				"	"	+ 10%	"	"	"	
Class "A", "B" and "C"	Ton	.05472 per Sq. Yd. (1" Thick)		"	"	+ 10%	"	"	"	
Emuls. Asphalt in Pav't Seal Coat	Ton	.000833 per Sq. Yd.		"	"	+ 10%	"	"	"	
Fine Aggregate in Pav't Seal Coat	C. Y.	.005 per Sq. Yd.		"	"	+ 5%	"	"	"	
Portland Cem. Con. Pave.	S.Y.	Calculated Area		"	"	+ 2%	"	"	"	
Cushion Course (½"-0")	C. Y.	1" Thick (Loose)		"	"	+ 5%	"	"	"	

* Table value from Standard Table of Details for Oil Mats, etc.

OREGON STATE HIGHWAY DEPARTMENT

TABLE of DETAILS

OIL MAT and BITUMINOUS MACADAM WEARING SURFACES

20 FOOT WIDTH

IR-2-1833

TYPE		O-30			O-9			O-11			B-2			B-3			B-11		
THICKNESS		3/8"			3/4"			1 1/4"			2"			2 1/2"			3"		
BIT. CEMENT		200-300 or RT-9			150-200 or RT-9			150-200 or RT-9			120-150 or RT-9			120-150 or RT-9			120-150 Asphalt		
		Size	Rates per Sq.Yd.	Quan. per Mile	Size	Rates per Sq.Yd.	Quan. per Mile	Size	Rates per Sq.Yd.	Quan. per Mile	Size	Rates per Sq.Yd.	Quan. per Mile	Size	Rates per Sq.Yd.	Quan. per Mile	Size	Rates per Sq.Yd.	Quan per Mile
1ST SPREAD	Bit. Cement		.325	14.55		.20	8.89		.20	8.89		.20	8.89		.20	8.89			
	Aggregate	3/4"-1/2" 1/2"-1/4" 1/4"-#10	.008 .004 .003	94 47 35	3/4"-1/2"	.013	153	1 1/4"-3/4"	.022	259	1 1/2"-3/4"	.024	282	1 1/2"-3/4"	.024	282	2 1/2"-1 1/4"	.060	704
2ND SPREAD	Bit. Cement								.375	16.67		.37	16.44		.37	16.44		1.00	44.44
	Aggregate							3/4"-1/2" 1/2"-1/4"	.009 .003	106 35	1 1/2"-3/4"	.021	246	1 1/2"-3/4"	.021	246	1 1/4"-3/4"	.020	235
3RD SPREAD	Bit. Cement											.375	16.67		.37	16.44		.375	16.67
	Aggregate										3/4"-1/2" 1/2"-1/4"	.009 .003	106 35	1 1/2"-3/4"	.021	246	3/4"-1/2" 1/2"-1/4"	.009 .003	106 35
4TH SPREAD	Bit. Cement														.375	16.67			
	Aggregate													3/4"-1/2" 1/2"-1/4"	.009 .003	106 35			
1ST SEAL	Bit. Cement*					.25	11.11		.325 .375	14.44 16.67		.325 .375	14.44 16.67		.325 .375	14.44 16.67		.325 .375	14.44 16.67
	Aggregate				1/2"-1/4" 1/4"-#10	.006 .003	71 35	1/2"-1/4" 1/4"-#10	.006 .003	71 35	1/2"-1/4" 1/4"-#10	.006 .003	71 35	1/2"-1/4" 1/4"-#10	.006 .003	71 35	1/2"-1/4" 1/4"-#10	.006 .003	71 35
2ND SEAL	Emuls. Asphalt					.25	12.32		.25	12.32		.25	12.32		.25	12.32		.25	12.32
	Aggregate				1/4"-#10	.006	71	1/4"-#10	.006	71	1/4"-#10	.006	71	1/4"-#10	.006	71	1/4"-#10	.006	71
Total Bit. Cement *			.325	14.55		.45	20.00		.900 .950	40.00 42.23		1.27 1.32	56.44 58.67		1.64 1.69	72.88 75.11		1.70 1.75	75.55 77.78
Total Emuls. Asphalt						.25	12.32		.25	12.32		.25	12.32		.25	12.32		.25	12.32
Aggregate		3/4"-1/2" 1/2"-1/4" 1/4"-#10	.008 .004 .003	94 47 35	3/4"-1/2" 1/2"-1/4" 1/4"-#10	.013 .006 .009	153 71 106	1 1/4"-3/4" 3/4"-1/2" 1/2"-1/4" 1/4"-#10	.022 .009 .009 .009	259 106 106 106	1 1/2"-3/4" 3/4"-1/2" 1/2"-1/4" 1/4"-#10	.045 .009 .009 .009	528 106 106 106	1 1/2"-3/4" 3/4"-1/2" 1/2"-1/4" 1/4"-#10	.066 .009 .009 .009	774 106 106 106	2 1/2"-1 1/4" 1 1/4"-3/4" 3/4"-1/2" 1/2"-1/4" 1/4"-#10	.060 .020 .009 .009 .009	704 235 106 106 106
Total Aggregate			.015	176		.028	330		.049	577		.072	846		.093	1092		.107	1257

"Rates per sq. yd." give aggregates in cu. yds. (truck measure) and bit. cements and emuls. asphalt in gallons (at normal application temperature). "Quantities per mile" show aggregates in cu. yds. (truck measure) and bituminous cements in tons (at 60°F), and emulsified asphalt in tons (at 70°F). For RT-9 tar increase asphalt quantities by 22%.

Use tar alternate only in that portion of the State lying West of the Cascades and north of Roseburg.
* Use the larger quantity ONLY in the coastal slope and Willamette drainage areas.

BASIC DATA for BIT. CEMENTS

Type of Bit. Cement	Gals/Ton @ 60°F	Normal Applic Temp	Gals/Ton @ Normal Applic. Temp.
SC-1	251	145	260
SC-2	248	225	263
SC-3	245	250	262
SC-4	243	275	262
SC-5	241	300	262
SC-6	239	325	262
RC-1	251	170	262
RC-2	248	200	260
RC-3	245	220	259
RC-4	243	240	259
40-100	235	375	262
100-200	237	375	264
200-300	239	325	262
Emuls.	237*	85	238
RT-4	217	150	222
RT-9	206	225	216
RT-12	201	250	213

* @ 70°F

November --- 1950

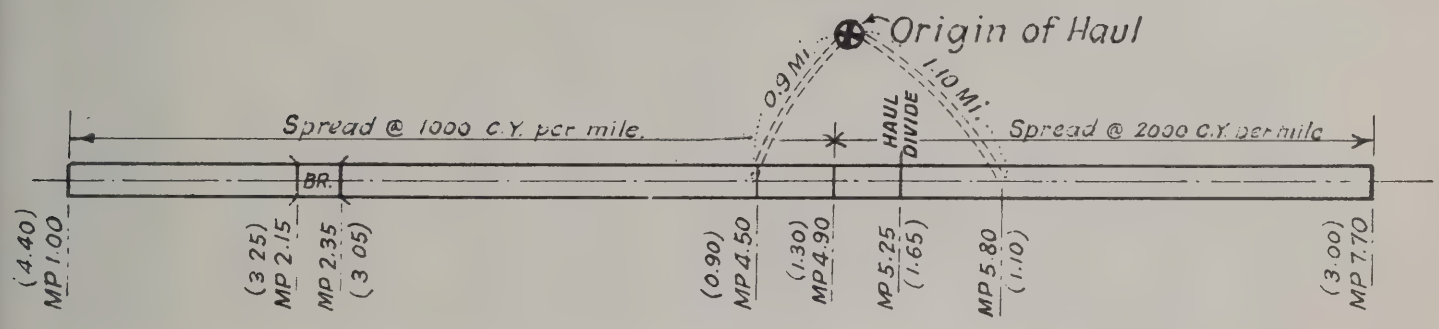
INSTRUCTIONS FOR USE OF TABLE "YARD MILES OF HAUL IN HALF MILE UNITS BASED ON ONE CUBIC YARD PER MILE"

The procedure to be followed in using the accompanying table is demonstrated by the following illustration of a typical haul problem and its solution.

Haul Problem

To calculate the yard miles of haul (in half-mile units, fractional half-miles being allowed for as full half-miles) required to distribute materials on a section of highway at known rates of spread, at known locations and from known origins of haul.

Illustration of Haul Problem



Solution of Haul Problem

1. Calculate the total haul distances from the origin of haul to each mile point at the ends of the section of highway involved, to each mile point at which the rates of spread change, to the mile points at which haul roads from the origin of haul enter the highway and to the mile points of any haul divides occurring within the limits of the section of highway involved. These total haul distances are shown in parenthesis at the respective mile points in the illustration.

2. Basically, the total quantity of yard miles of haul required to distribute materials on a given unit of highway at a given uniform rate is the difference between (a) the table value for the haul distance to the far end of the unit and (b) the table value for the haul distance to the near end of the unit; multiplied by the uniform rate of spread of material on the given unit.

3. For the unit of highway between M.P. 1.00 and M.P. 2.15, in the illustration, the computation is as follows:

Table Value for 4.40 miles = 10.800
Table Value for 3.25 miles = 6.125

Difference = 4.675

Total Yard Miles of Haul = 4.675 × 1,000 = 4,675

4. For the unit of highway between M.P. 4.90 and M.P. 5.25, the computation is as follows:

Table Value for 1.65 miles = 1.800
Table Value for 1.30 miles = 1.200

Difference = 0.600

Total Yard Miles of Haul = 0.600 × 2,000 = 1,200

5. For the entire section of highway illustrated, and proceeding in the above manner above indicated, the computation (in brief form) are as follows:

At 1,000 c.y./mi.

4.40 = 10.800	3.05 = 5.452	1.30 = 1.200
3.25 = 6.125	0.90 = 0.650	0.90 = 0.650
Diff. = 4.675	Diff. = 4.775	Diff. = 0.550

Sum of Differences =
4.675 + 4.775 + 0.550 = 10.000

Total Yard Miles = 10.000 × 1,000 = 10,000

At 2,000 c.y./mi.		
1.65 = 1.800	1.65 = 1.800	3.00 = 5.250
1.30 = 1.200	1.10 = 0.900	1.10 = 0.900
Diff. = 0.600	Diff. = 0.900	Diff. = 4.350

Sum of Differences =
0.600 + 0.900 + 4.350 = 5.850

Total Yard Miles = 5.850 × 2,000 = 11,700

Total Yard Miles of Haul =
10,000 + 11,700 = 21,700

6. The accompanying table is compiled from the basic formula for the sum of the terms in an arithmetical progression; i.e. $S = \frac{1}{2}(a + 1)n$, in which $a = 0.25$; $1 = \frac{1}{2}$ of the haul distance and n = twice the haul distance. This formula gives the haul quantities at the full half-mile points in the table. For fractional distances between half-mile points, the fractional increments of haul quantity are proportions by distance of the whole increment of haul quantity between the half-mile points.

YARD MILES OF HAUL IN HALF MILE UNITS
BASED ON ONE CUBIC YARD PER MILE

Dist.	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.000	.005	.010	0.15	.020	.025	.030	.035	.040	.045
0.1	.050	.055	.060	.065	.070	.075	.080	.085	.090	.095
0.2	.100	.105	.110	.115	.120	.125	.130	.135	.140	.145
0.3	.150	.155	.160	.165	.170	.175	.180	.185	.190	.195
0.4	.200	.205	.210	.215	.220	.225	.230	.235	.240	.245
0.5	.250	.260	.270	.280	.290	.300	.310	.320	.330	.340
0.6	.350	.360	.370	.380	.390	.400	.410	.420	.430	.440
0.7	.450	.460	.470	.480	.490	.500	.510	.520	.530	.540
0.8	.550	.560	.570	.580	.590	.600	.610	.620	.630	.640
0.9	.650	.660	.670	.680	.690	.700	.710	.720	.730	.740
1.0	.750	.765	.780	.795	.810	.825	.840	.855	.870	.885
1.1	.900	.915	.930	.945	.960	.975	.990	1.005	1.020	1.035
1.2	1.050	1.065	1.080	1.095	1.110	1.125	1.140	1.155	1.170	1.185
1.3	1.200	1.215	1.230	1.245	1.260	1.275	1.290	1.305	1.320	1.335
1.4	1.350	1.365	1.380	1.395	1.410	1.425	1.440	1.455	1.470	1.485
1.5	1.500	1.520	1.540	1.560	1.580	1.600	1.620	1.640	1.660	1.680
1.6	1.700	1.720	1.740	1.760	1.780	1.800	1.820	1.840	1.860	1.880
1.7	1.900	1.920	1.940	1.960	1.980	2.000	2.020	2.040	2.060	2.080
1.8	2.100	2.120	2.140	2.160	2.180	2.200	2.220	2.240	2.260	2.280
1.9	2.300	2.320	2.340	2.360	2.380	2.400	2.420	2.440	2.460	2.480
2.0	2.500	2.525	2.550	2.575	2.600	2.625	2.650	2.675	2.700	2.725
2.1	2.750	2.775	2.800	2.825	2.850	2.875	2.900	2.925	2.950	2.975
2.2	3.000	3.025	3.050	3.075	3.100	3.125	3.150	3.175	3.200	3.225
2.3	3.250	3.275	3.300	3.325	3.350	3.375	3.400	3.425	3.450	3.475
2.4	3.500	3.525	3.550	3.575	3.600	3.625	3.650	3.675	3.700	3.725
2.5	3.750	3.780	3.810	3.840	3.870	3.900	3.930	3.960	3.990	4.020
2.6	4.050	4.080	4.110	4.140	4.170	4.200	4.230	4.260	4.290	4.320
2.7	4.350	4.380	4.410	4.440	4.470	4.500	4.530	4.560	4.590	4.620
2.8	4.650	4.680	4.710	4.740	4.770	4.800	4.830	4.860	4.890	4.920
2.9	4.950	4.980	5.010	5.040	5.070	5.100	5.130	5.160	5.190	5.220
3.0	5.250	5.285	5.320	5.355	5.390	5.425	5.460	5.495	5.530	5.565
3.1	5.600	5.635	5.670	5.705	5.740	5.775	5.810	5.845	5.880	5.915
3.2	5.950	5.985	6.020	6.055	6.090	6.125	6.160	6.195	6.230	6.265
3.3	6.300	6.335	6.370	6.405	6.440	6.475	6.510	6.545	6.580	6.615
3.4	6.650	6.685	6.720	6.755	6.790	6.825	6.860	6.895	6.930	6.965
3.5	7.000	7.040	7.080	7.120	7.160	7.200	7.240	7.280	7.320	7.360
3.6	7.400	7.440	7.480	7.520	7.560	7.600	7.640	7.680	7.720	7.760
3.7	7.800	7.840	7.880	7.920	7.960	8.000	8.040	8.080	8.120	8.160
3.8	8.200	8.240	8.280	8.320	8.360	8.400	8.440	8.480	8.520	8.560
3.9	8.600	8.640	8.680	8.720	8.760	8.800	8.840	8.880	8.920	8.960

YARD MILES OF HAUL IN HALF MILE UNITS
BASED ON ONE CUBIC YARD PER MILE

Dist.	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
4.0	9.000	9.045	9.090	9.135	9.180	9.225	9.270	9.315	9.360	9.405
4.1	9.450	9.495	9.540	9.585	9.630	9.675	9.720	9.765	9.810	9.855
4.2	9.900	9.945	9.990	10.035	10.080	10.125	10.170	10.215	10.260	10.305
4.3	10.350	10.395	10.440	10.485	10.530	10.575	10.620	10.665	10.710	10.755
4.4	10.800	10.845	10.890	10.935	10.980	11.025	11.070	11.115	11.160	11.205
4.5	11.250	11.300	11.350	11.400	11.450	11.500	11.550	11.600	11.650	11.700
4.6	11.750	11.800	11.850	11.900	11.950	12.000	12.050	12.100	12.150	12.200
4.7	12.250	12.300	12.350	12.400	12.450	12.500	12.550	12.600	12.650	12.700
4.8	12.750	12.800	12.850	12.900	12.950	13.000	13.050	13.100	13.150	13.200
4.9	13.250	13.300	13.350	13.400	13.450	13.500	13.550	13.600	13.650	13.700
5.0	13.750	13.805	13.860	13.915	13.970	14.025	14.080	14.135	14.190	14.245
5.1	14.300	14.355	14.410	14.465	14.520	14.575	14.630	14.685	14.740	14.795
5.2	14.850	14.905	14.960	15.015	15.070	15.125	15.180	15.235	15.290	15.345
5.3	15.400	15.455	15.510	15.565	15.620	15.675	15.730	15.785	15.840	15.895
5.4	15.950	16.005	16.060	16.115	16.170	16.225	16.280	16.335	16.390	16.445
5.5	16.500	16.560	16.620	16.680	16.740	16.800	16.860	16.920	16.980	17.040
5.6	17.100	17.160	17.220	17.280	17.340	17.400	17.460	17.520	17.580	17.640
5.7	17.700	17.760	17.820	17.880	17.940	18.000	18.060	18.120	18.180	18.240
5.8	18.300	18.360	18.420	18.480	18.540	18.600	18.660	18.720	18.780	18.840
5.9	18.900	18.960	19.020	19.080	19.140	19.200	19.260	19.320	19.380	19.440
6.0	19.500	19.565	19.630	19.695	19.760	19.825	19.890	19.955	20.020	20.085
6.1	20.150	20.215	20.280	20.345	20.410	20.475	20.540	20.605	20.670	20.735
6.2	20.800	20.865	20.930	20.995	21.060	21.125	21.190	21.255	21.320	21.385
6.3	21.450	21.515	21.580	21.645	21.710	21.775	21.840	21.905	21.970	22.035
6.4	22.100	22.165	22.230	22.295	22.360	22.425	22.490	22.555	22.620	22.685
6.5	22.750	22.820	22.890	22.960	23.030	23.100	23.170	23.240	23.310	23.380
6.6	23.450	23.520	23.590	23.660	23.730	23.800	23.870	23.940	24.010	24.080
6.7	24.150	24.220	24.290	24.360	24.430	24.500	24.570	24.640	24.710	24.780
6.8	24.850	24.920	24.990	25.060	25.130	25.200	25.270	25.340	25.410	25.480
6.9	25.550	25.620	25.690	25.760	25.830	25.900	25.970	26.040	26.110	26.180
7.0	26.250	26.325	26.400	26.475	26.550	26.625	26.700	26.775	26.850	26.925
7.1	27.000	27.075	27.150	27.225	27.300	27.375	27.450	27.525	27.600	27.675
7.2	27.750	27.825	27.900	27.975	28.050	28.125	28.200	28.275	28.350	28.425
7.3	28.500	28.575	28.650	28.725	28.800	28.875	28.950	29.025	29.100	29.175
7.4	29.250	29.325	29.400	29.475	29.550	29.625	29.700	29.775	29.850	29.925
7.5	30.000	30.080	30.160	30.240	30.320	30.400	30.480	30.560	30.640	30.720
7.6	30.800	30.880	30.960	31.040	31.120	31.200	31.280	31.360	31.440	31.520
7.7	31.600	31.680	31.760	31.840	31.920	32.000	32.080	32.160	32.240	32.320
7.8	32.400	32.480	32.560	32.640	32.720	32.800	32.880	32.960	33.040	33.120
7.9	33.200	33.280	33.360	33.440	33.520	33.600	33.680	33.760	33.840	33.920
8.0	34.000	34.085	34.170	34.255	34.340	34.425	34.510	34.595	34.680	34.765
8.1	34.850	34.935	35.020	35.105	35.190	35.275	35.360	35.445	35.530	35.615
8.2	35.700	35.785	35.870	35.955	36.040	36.125	36.210	36.295	36.380	36.465
8.3	36.550	36.635	36.720	36.805	36.890	36.975	37.060	37.145	37.230	37.315
8.4	37.400	37.485	37.570	37.655	37.740	37.825	37.910	37.995	38.080	38.165
8.5	38.250	38.340	38.430	38.520	38.610	38.700	38.790	38.880	38.970	39.060
8.6	39.150	39.240	39.330	39.420	39.510	39.600	39.690	39.780	39.870	39.960
8.7	40.050	40.140	40.230	40.320	40.410	40.500	40.590	40.680	40.770	40.860
8.8	40.950	41.040	41.130	41.220	41.310	41.400	41.490	41.580	41.670	41.760
8.9	41.850	41.940	42.030	42.120	42.210	42.300	42.390	42.480	42.570	42.660

YARD MILES OF HAUL IN HALF MILE UNITS
BASED ON ONE CUBIC YARD PER MILE

Dist.	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
9.0	42.750	42.845	42.940	43.035	43.130	43.225	43.320	43.415	43.510	43.605
9.1	43.700	43.795	43.890	43.985	44.080	44.175	44.270	44.365	44.460	44.555
9.2	44.650	44.745	44.840	44.935	45.030	45.125	45.220	45.315	45.410	45.505
9.3	45.600	45.695	45.790	45.885	45.980	46.075	46.170	46.265	46.360	46.455
9.4	46.550	46.645	46.740	46.835	46.930	47.025	47.120	47.215	47.310	47.405
9.5	47.500	47.600	47.700	47.800	47.900	48.000	48.100	48.200	48.300	48.400
9.6	48.500	48.600	48.700	48.800	48.900	49.000	49.100	49.200	49.300	49.400
9.7	49.500	49.600	49.700	49.800	49.900	50.000	50.100	50.200	50.300	50.400
9.8	50.500	50.600	50.700	50.800	50.900	51.000	51.100	51.200	51.300	51.400
9.9	51.500	51.600	51.700	51.800	51.900	52.000	52.100	52.200	52.300	52.400
10.0	52.500	52.605	52.710	52.815	52.920	53.025	53.130	53.235	53.340	53.445
10.1	53.550	53.655	53.760	53.865	53.970	54.075	54.180	54.285	54.390	54.495
10.2	54.600	54.705	54.810	54.915	55.020	55.125	55.230	55.335	55.440	55.545
10.3	55.650	55.755	55.860	55.965	56.070	56.175	56.280	56.385	56.490	56.595
10.4	56.700	56.805	56.910	57.015	57.120	57.225	57.330	56.435	57.540	57.645
10.5	57.750	57.860	57.970	58.080	58.190	58.300	58.410	58.520	58.630	58.740
10.6	58.850	58.960	59.070	59.180	59.290	59.400	59.510	59.620	59.730	59.840
10.7	59.950	60.060	60.170	60.280	60.390	60.500	60.610	60.720	60.830	60.940
10.8	61.050	61.160	61.270	61.380	61.490	61.600	61.710	61.820	61.930	62.040
10.9	62.150	62.260	62.370	62.480	62.590	62.700	62.810	62.920	63.030	63.140
11.0	63.250	63.365	63.480	63.595	63.710	63.825	63.940	64.055	64.170	64.285
11.1	64.400	64.515	64.630	64.745	64.860	64.975	65.090	65.205	65.320	65.435
11.2	65.550	65.665	65.780	65.895	66.010	66.125	66.240	66.355	66.470	66.585
11.3	66.700	66.815	66.930	67.045	67.160	67.275	67.390	67.505	67.620	67.735
11.4	67.850	67.965	68.080	68.195	68.310	68.425	68.540	68.655	68.770	68.885
11.5	69.000	69.120	69.240	69.360	69.480	69.600	69.720	69.840	69.960	70.080
11.6	70.200	70.320	70.440	70.560	70.680	70.800	70.920	71.040	71.160	71.280
11.7	71.400	71.520	71.640	71.760	71.880	72.000	72.120	72.240	72.360	72.480
11.8	72.600	72.720	72.840	72.960	73.080	73.200	73.320	73.440	73.560	73.680
11.9	73.800	73.920	74.040	74.160	74.280	74.400	74.520	74.640	74.760	74.880
12.0	75.000	75.125	75.250	75.375	75.500	75.625	75.750	75.875	76.000	76.125
12.1	76.250	76.375	76.500	76.625	76.750	76.875	77.000	77.125	77.250	77.375
12.2	77.500	77.625	77.750	77.875	78.000	78.125	78.250	78.375	78.500	78.625
12.3	78.750	78.875	79.000	79.125	79.250	79.375	79.500	79.625	79.750	79.875
12.4	80.000	80.125	80.250	80.375	80.500	80.625	80.750	80.875	81.000	81.125
12.5	81.250	81.380	81.510	81.640	81.770	81.900	82.030	82.160	82.290	82.420
12.6	82.550	82.680	82.810	82.940	83.070	83.200	83.330	83.460	83.590	83.720
12.7	83.850	83.980	84.110	84.240	84.370	84.500	84.630	84.760	84.890	85.020
12.8	85.150	85.280	85.410	85.540	85.670	85.800	85.930	86.060	86.190	86.320
12.9	86.450	86.580	86.710	86.840	86.970	87.100	87.230	87.360	87.490	87.620
13.0	87.750	87.885	88.020	88.155	88.290	88.425	88.560	88.695	88.830	88.965
13.1	89.100	89.235	89.370	89.505	89.640	89.775	89.910	90.045	90.180	90.315
13.2	90.450	90.585	90.720	90.855	90.990	91.125	91.260	91.395	91.530	91.665
13.3	91.800	91.935	92.070	92.205	92.340	92.475	92.610	92.745	92.880	93.015
13.4	93.150	93.285	93.420	93.555	93.690	93.825	93.960	94.095	94.230	94.365
13.5	94.500	94.640	94.780	94.920	95.060	95.200	95.340	95.480	95.620	95.760
13.6	95.900	96.040	96.180	96.320	96.460	96.600	96.740	96.880	97.020	97.160
13.7	97.300	97.440	97.580	97.720	97.860	98.000	98.140	98.280	98.420	98.560
13.8	98.700	98.840	98.980	99.120	99.260	99.400	99.540	99.680	99.820	99.960
13.9	100.100	100.240	100.380	100.520	100.660	100.800	100.940	101.080	101.220	101.360

YARD MILES OF HAUL IN HALF MILE UNITS
BASED ON ONE CUBIC YARD PER MILE

Dist.	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
14.0	101.500	101.645	101.790	101.935	102.080	102.225	102.370	102.515	102.660	102.805
14.1	102.950	103.095	103.240	103.385	103.530	103.675	103.820	103.965	104.110	104.255
14.2	104.400	104.545	104.690	104.835	104.980	105.125	105.270	105.415	105.560	105.705
14.3	105.850	105.995	106.140	106.285	106.430	106.575	106.720	106.865	107.010	107.155
14.4	107.300	107.445	107.590	107.735	107.880	108.025	108.170	108.315	108.460	108.605
14.5	108.750	108.900	109.050	109.200	109.350	109.500	109.650	109.800	109.950	110.100
14.6	110.250	110.400	110.550	110.700	110.850	111.000	111.150	111.300	111.450	111.600
14.7	111.750	111.900	112.050	112.200	112.350	112.500	112.650	112.800	112.950	113.100
14.8	113.250	113.400	113.550	113.700	113.850	114.000	114.150	114.300	114.450	114.600
14.9	114.750	114.900	115.050	115.200	115.350	115.500	115.650	115.800	115.950	116.100
15.0	116.250	116.405	116.560	116.715	116.870	117.025	117.180	117.335	117.490	117.645
15.1	117.800	117.955	118.110	118.265	118.420	118.575	118.730	118.885	119.040	119.195
15.2	119.350	119.505	119.660	119.815	119.970	120.125	120.280	120.435	120.590	120.745
15.3	120.900	121.055	121.210	121.365	121.520	121.675	121.830	121.985	122.140	122.295
15.4	122.450	122.605	122.760	122.915	123.070	123.225	123.380	123.535	123.690	123.845
15.5	124.000	124.160	124.320	124.480	124.640	124.800	124.960	125.120	125.280	125.440
15.6	125.600	125.760	125.920	126.080	126.240	126.400	126.560	126.720	126.880	127.040
15.7	127.200	127.360	127.520	127.680	127.840	128.000	128.160	128.320	128.480	128.640
15.8	128.800	128.960	129.120	129.280	129.440	129.600	129.760	129.920	130.080	130.240
15.9	130.400	130.560	130.720	130.880	131.040	131.200	131.360	131.520	131.680	131.840
16.0	132.000	132.165	132.330	132.495	132.660	132.825	132.990	133.155	133.320	133.485
16.1	133.650	133.815	133.980	134.145	134.310	134.475	134.640	134.805	134.970	135.135
16.2	135.300	135.465	135.630	135.795	135.960	136.125	136.290	136.455	136.620	136.785
16.3	136.950	137.115	137.280	137.445	137.610	137.775	137.940	138.105	138.270	138.435
16.4	138.600	138.765	138.930	139.095	139.260	139.425	139.590	139.755	139.920	140.085
16.5	140.250	140.420	140.590	140.760	140.930	141.100	141.270	141.440	141.610	141.780
16.6	141.950	142.120	142.290	142.460	142.630	142.800	142.970	143.140	143.310	143.480
16.7	143.650	143.820	143.990	144.160	144.330	144.500	144.670	144.840	145.010	145.180
16.8	145.350	145.520	145.690	145.860	146.030	146.200	146.370	146.540	146.710	146.880
16.9	147.050	147.220	147.390	147.560	147.730	147.900	148.070	148.240	148.410	148.580
17.0	148.750	148.925	149.100	149.275	149.450	149.625	149.800	149.975	150.150	150.325
17.1	150.500	150.675	150.850	151.025	151.200	151.375	151.550	151.725	151.900	152.075
17.2	152.250	152.425	152.600	152.775	152.950	153.125	153.300	153.475	153.650	153.825
17.3	154.000	154.175	154.350	154.525	154.700	154.875	155.050	155.225	155.400	155.575
17.4	155.750	155.925	156.100	156.275	156.450	156.625	156.800	156.975	157.150	157.325
17.5	157.500	157.680	157.860	158.040	158.220	158.400	158.580	158.760	158.940	159.120
17.6	159.300	159.480	159.660	159.840	160.020	160.200	160.380	160.560	160.740	160.920
17.7	161.100	161.280	161.460	161.640	161.820	162.000	162.180	162.360	162.540	162.720
17.8	162.900	163.080	163.260	163.440	163.620	163.800	163.980	164.160	164.340	164.520
17.9	164.700	164.880	165.060	165.240	165.420	165.600	165.780	165.960	166.140	166.320
18.0	166.500	166.685	166.870	167.055	167.240	167.425	167.610	167.795	167.980	168.165
18.1	168.350	168.535	168.720	168.905	169.090	169.275	169.460	169.645	169.830	170.015
18.2	170.200	170.385	170.570	170.755	170.940	171.125	171.310	171.495	171.680	171.865
18.3	172.050	172.235	172.420	172.605	172.790	172.975	173.160	173.345	173.530	173.715
18.4	173.900	174.085	174.270	174.455	174.640	174.825	175.010	175.195	175.380	175.565
18.5	175.750	175.940	176.130	176.320	176.510	176.700	176.890	177.080	177.270	177.460
18.6	177.650	177.840	178.030	178.220	178.410	178.600	178.790	178.980	179.170	179.360
18.7	179.550	179.740	179.930	180.120	180.310	180.500	180.690	180.880	181.070	181.260
18.8	181.450	181.640	181.830	182.020	182.210	182.400	182.590	182.780	182.970	183.160
18.9	183.350	183.540	183.730	183.920	184.110	184.300	184.490	184.680	184.870	185.060

YARD MILES OF HAUL IN HALF MILE UNITS
BASED ON ONE CUBIC YARD PER MILE

Dist.	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
19.0	185.250	185.445	185.640	185.835	186.030	186.225	186.420	186.615	186.810	187.005
19.1	187.200	187.395	187.590	187.785	187.980	188.175	188.370	188.565	188.760	188.955
19.2	189.150	189.345	189.540	189.735	189.930	190.125	190.320	190.515	190.710	190.905
19.3	191.100	191.295	191.490	191.685	191.880	192.075	192.270	192.465	192.660	192.855
19.4	193.050	193.245	193.440	193.635	193.830	194.025	194.220	194.415	194.610	194.805
19.5	195.000	195.200	195.400	195.600	195.800	196.000	196.200	196.400	196.600	196.800
19.6	197.000	197.200	197.400	197.600	197.800	198.000	198.200	198.400	198.600	198.800
19.7	199.000	199.200	199.400	199.600	199.800	200.000	200.200	200.400	200.600	200.800
19.8	201.000	201.200	201.400	201.600	201.800	202.000	202.200	202.400	202.600	202.800
19.9	203.000	203.200	203.400	203.600	203.800	204.000	204.200	204.400	204.600	204.800
20.0	205.000	205.205	205.410	205.615	205.820	206.025	206.230	206.435	206.640	206.845
20.1	207.050	207.255	207.460	207.665	207.870	208.075	208.280	208.485	208.690	208.895
20.2	209.100	209.305	209.510	209.715	209.920	210.125	210.330	210.535	210.740	210.945
20.3	211.150	211.355	211.560	211.765	211.970	212.175	212.380	212.585	212.790	212.995
20.4	213.200	213.405	213.610	213.815	214.020	214.225	214.430	214.635	214.840	215.045
20.5	215.250	215.460	215.670	215.880	216.090	216.300	216.510	216.720	216.930	217.140
20.6	217.350	217.560	217.770	217.980	218.190	218.400	218.610	218.820	219.030	219.240
20.7	219.450	219.660	219.870	220.080	220.290	220.500	220.710	220.920	221.130	221.340
20.8	221.550	221.760	221.970	222.180	222.390	222.600	222.810	223.020	223.230	223.440
20.9	223.650	223.860	224.070	224.280	224.490	224.700	224.910	225.120	225.330	225.540

CORRUGATED PIPE CULVERTS

Capacity in Second Feet

With Water Surface at Top of Pipe at Inlet and Outlet Unsubmerged

Max. $2.58D^{5/2}$ N = .021

Diameter of Pipe in Inches

Slope in Per Cent	8	10	12	15	18	21	24	30	36	42	48	54	60	66	72	78	84	90	96	108	120
.1	0.2	0.4	0.7	1.3	2.1	3.1	4.4	8	13	20	28	38	51	66	83	102	125	150	178	243	322
.2	0.3	0.6	1.0	1.8	2.9	4.3	6.2	11	17	28	39	54	71	92	115	143	174	209	248	339	448
.3	0.4	0.7	1.2	2.2	3.5	5.3	7.5	14	22	33	48	65	86	111	140	173	210	252	299	409	541
.4	0.5	0.8	1.4	2.5	4.0	6.1	8.6	16	25	38	54	74	98	126	159	196	238	286	339	463	611
.5	0.5	0.9	1.5	2.7	4.5	6.7	9.6	17	28	42	60	82	108	139	175	215	262	314	372	507	668
.6	0.6	1.0	1.7	3.0	4.8	7.3	10.4	19	30	45	65	88	116	149	188	232	281	337	399	545	715
.7	0.6	1.1	1.8	3.2	5.2	7.8	11.7	20	32	48	68	93	123	158	198	245	297	356	421	572	752
.8	0.6	1.2	1.9	3.4	5.5	8.2	12.2	21	34	51	72	98	129	165	206	256	310	370	438	595	781
.9	0.7	1.2	2.0	3.5	5.7	8.6	12.7	22	35	53	75	102	134	171	215	265	320	383	453	614	804
1.0	0.7	1.3	2.1	3.7	6.0	8.9	13.5	23	37	55	77	105	138	176	220	272	329	393	464	627	816
1.2	0.8	1.4	2.2	4.0	6.4	9.5	14.0	24	38	58	81	110	144	183	227	278	334	397	467	627	816
1.4	0.8	1.4	2.3	4.2	6.7	10.0	14.5	25	40	59	83	111	144	183	227	278	334	397	467	627	816
1.6	0.8	1.5	2.4	4.3	6.9	10.3	14.6	25	40	59	83	111	144	183	227	278	334	397	467	627	816
1.8	0.9	1.6	2.5	4.4	7.1	10.5	14.6	25	40	59	83	111	144	183	227	278	334	397	467	627	816
2.0	0.9	1.6	2.6	4.5	7.1	10.5	14.6	25	40	59	83	111	144	183	227	278	334	397	467	627	816
2.2	0.9	1.6	2.6	4.5	7.1	10.5	14.6	25	40	59	83	111	144	183	227	278	334	397	467	627	816
2.4	0.9	1.6	2.6	4.5	7.1	10.5	14.6	25	40	59	83	111	144	183	227	278	334	397	467	627	816

CONCRETE BOX CULVERTS

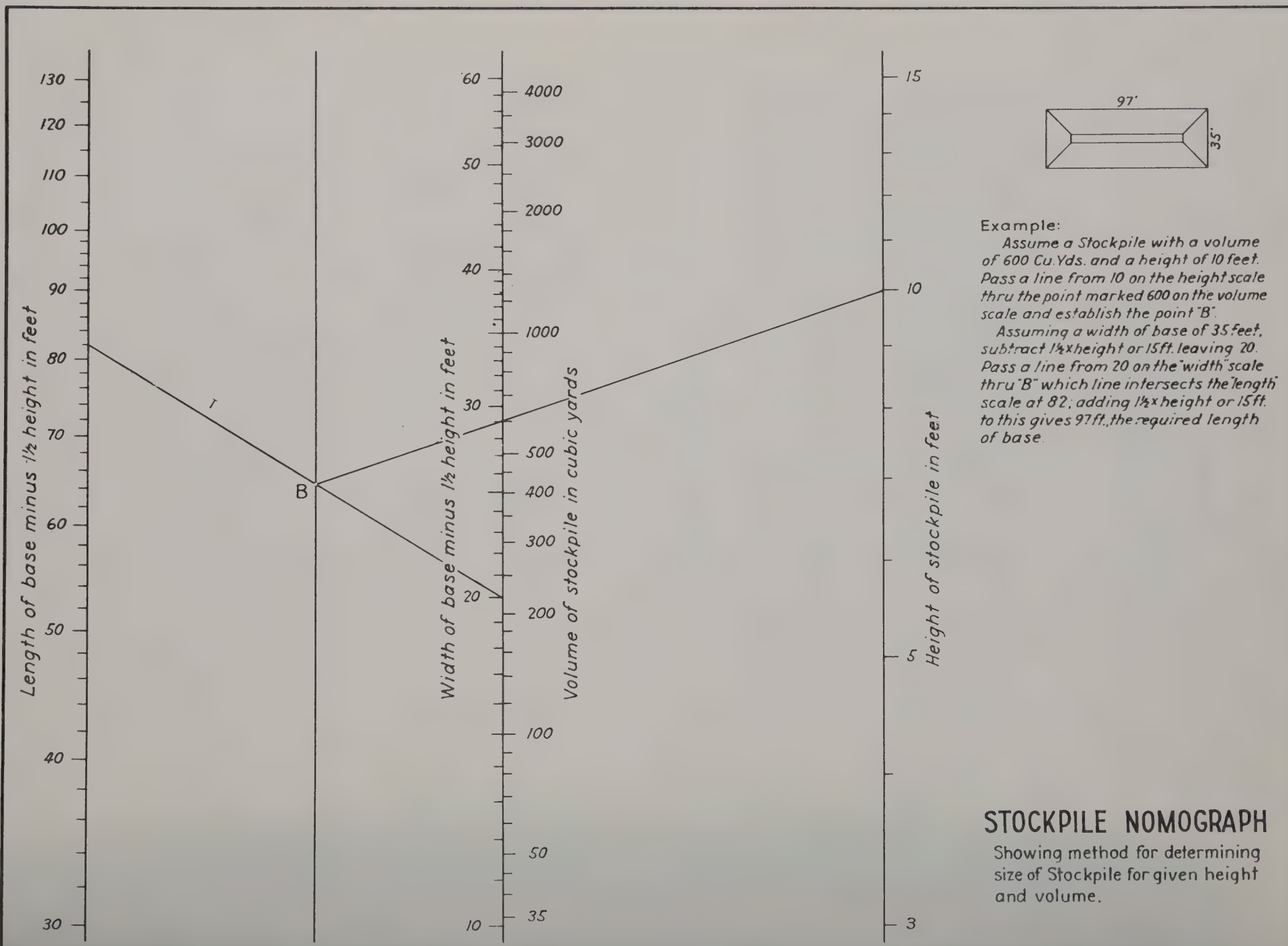
Capacity in Second Feet

With Water Surface at Top of Box at Inlet and Outlet Unsubmerged

Size of Box in Feet

Slope in Per Cent	2 x 2	2 x 3	3 x 3	3 x 4	3 x 5	3 x 6	3 x 8	3 x 10	4 x 4	4 x 5	4 x 6	4 x 8	4 x 10	4 x 12	5 x 5	5 x 6	5 x 8
0.1	7	13	22	31	40	50	71	92	45	61	76	108	141	174	82	104	149
0.2	10	18	29	42	55	68	95	122	62	82	103	145	188	231	112	141	200
0.3	12	21	34	49	64	79	110	141	73	97	120	168	217	265	131	165	233
0.4	13	23	38	54	71	87	119	152	80	107	132	182	234	284	146	181	253
0.5	14	24	41	58	75	92	125	158	87	116	140	196	244	294	156	193	267
0.6	15	25	44	61	78	95	128	160	92	119	145	197	247	296	164	201	274
0.7	16	26	45	63	80	96	128	160	95	122	148	198	247	296	168	206	276
0.8	16	26	47	64	80	96	128	160	97	123	148	198	247	296	171	207	276
0.9	17	26	47	64	80	96	128	160	99	123	148	198	247	296	173	207	276
1.0	17	26	48	64	80	96	128	160	99	123	148	198	247	296	173	207	276

Slope in Per Cent	5 x 10	5 x 12	6 x 6	6 x 8	6 x 10	6 x 12	7 x 7	7 x 8	7 x 10	7 x 12	8 x 8	8 x 10	8 x 12	10 x 10	10 x 12	12 x 12
0.1	195	243	133	193	254	317	200	238	316	395	286	380	478	516	652	837
0.2	261	333	181	259	340	421	272	321	423	527	386	511	638	695	873	1,124
0.3	301	370	213	302	393	484	318	375	490	606	452	592	735	810	1,010	1,304
0.4	325	397	234	330	425	520	350	411	532	653	496	645	793	885	1,095	1,419
0.5	339	411	250	348	445	540	373	435	558	679	527	678	826	936	1,146	1,492
0.6	345	414	262	359	454	544	388	450	571	685	546	695	838	965	1,170	1,532
0.7	345	414	268	363	454	544	397	457	571	685	557	698	838	976	1,171	1,540
0.8	345	414	272	363	454	544	400	457	571	685	559	698	838	976	1,171	1,540
0.9	345	414	272	363	454	544	400	457	571	685	559	698	838	976	1,171	1,540
1.0	345	414	272	363	454	544	400	457	571	685	559	698	838	976	1,171	1,540



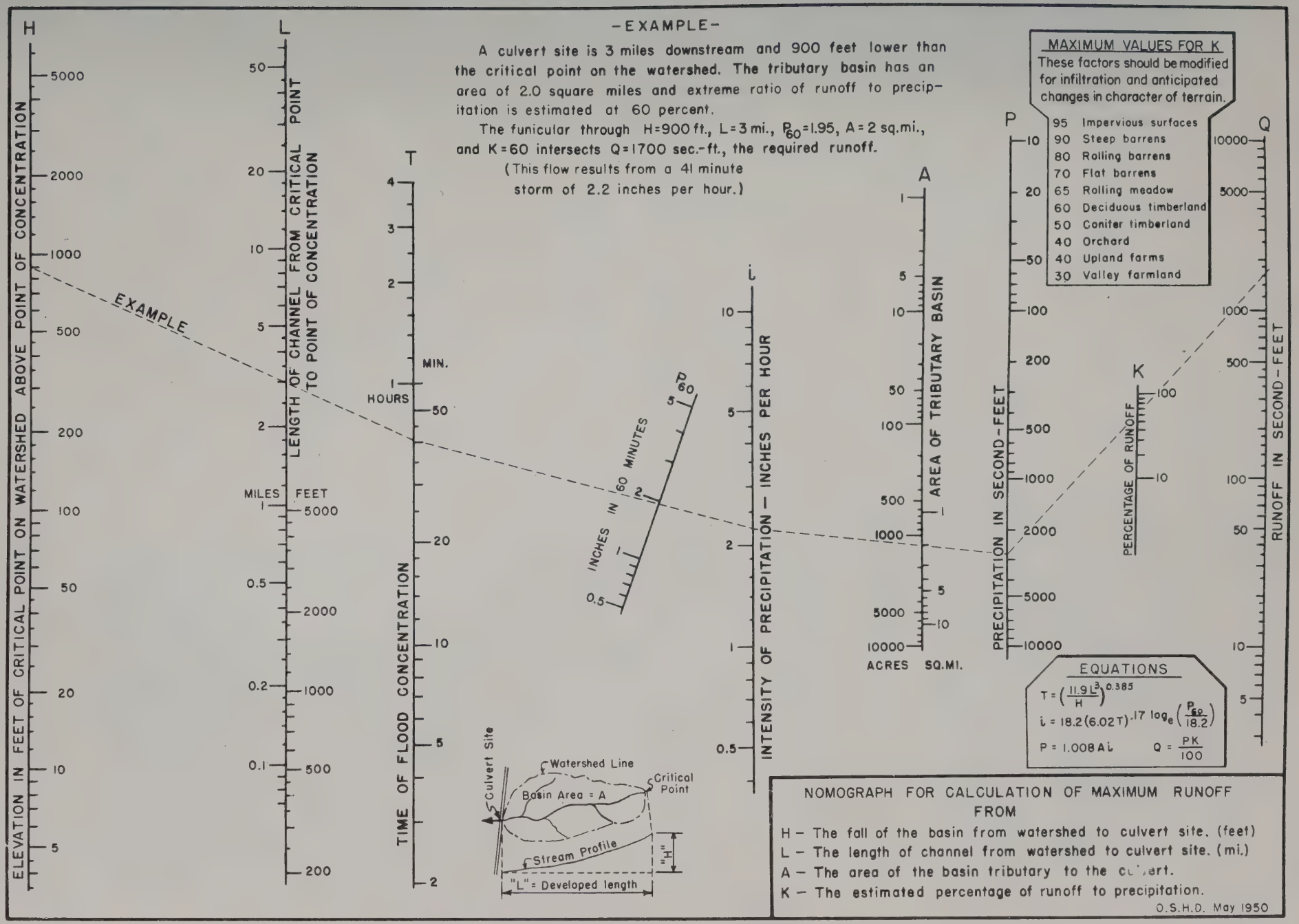
Example:

Assume a Stockpile with a volume of 600 Cu.Yds. and a height of 10 feet. Pass a line from 10 on the height scale thru the point marked 600 on the volume scale and establish the point "B".

Assuming a width of base of 35 feet, subtract 1½ x height or 15 ft. leaving 20. Pass a line from 20 on the "width" scale thru "B" which line intersects the "length" scale at 82; adding 1½ x height or 15 ft. to this gives 97 ft., the required length of base.

STOCKPILE NOMOGRAPH

Showing method for determining size of Stockpile for given height and volume.



BASED ON CALIFORNIA DIVISION OF HIGHWAYS CHART

SECTION 11. MAPS AND PROFILES

Article

1. Titles to be Placed on all Records.
2. Maps and Profiles to be Separate.
3. Maps and Profiles to be From Left to Right.
4. Plat Maps by Coordinates.
5. Tracings.
6. 100-Foot Detail Map.
7. 400-Foot Detail Map.
8. 1,000-Foot Map.
9. Show Information Obtained from Plats, Etc., in Parentheses.
10. Vicinity Map of Railroad Crossing for Public Utilities Commission.
11. Vicinity Map for Design Purposes.
12. Profiles.
13. Profile Summary.
14. Show Data to Retrace Line.
15. Show Quantities to Construct Drainage System.
16. Construction Map.

Article 1—Titles to be Placed on All Records

The main title on roll maps and profiles shall be placed on the left end of the roll. On single sheet maps, etc., the title shall be placed on the lower right-hand corner.

All maps, profiles and other data submitted shall have complete sub-titles of the following sample form:

Pacific Highway—Douglas County
Oakland-Wilbur Section
Station 300-345
Located L^2 Line
Length of Section 0.85 Miles

Locating Engineer March 30, 1938

On records submitted in rolls this title shall be placed on each end of the roll on the outside, and on tracings an additional title shall be placed on the inside in such a manner that when prints are made they can be identified.

Article 2—Maps and Profiles to be Separate

Combination sheets showing map above and profile below shall *not* be used for preliminary or location surveys.

No map or profile shall be made over 320 inches long.

Article 3—Maps and Profiles to be from Left to Right

All maps and profiles shall be laid out from left to right.

Stationing should run from north to south or from west to east.

Article 4—Plat Maps by Coordinates

All maps shall be platted by coordinates and the latitude and departure of each coordinate point shall be inked on the map. Coordinates shall be computed on Form E-38 and must be turned in with the other records at the completion or suspension of the survey.

The Lambert System of Plane Coordinates shall be used whenever ties can conveniently be made to permanent monuments whose positions are known. (See "Lambert System of Plane Coordinates", Sec. 5, Art. 13.)

Article 5—Tracings

Tracings to be made in the field shall be as follows:

(a) All profiles (10 x 10 cloth).
(b) Vicinity and small maps (Federal aid sheets or plain sheets).
(c) Tracings ordered by the Division Engineer or the Construction Engineer.

Article 6—100-Foot Detail Map

The 100-foot detail map will be prepared by the Resident Engineer's forces on buff-colored detail paper, twenty-one inches wide unless otherwise ordered by the Division Engineer or the Construction Engineer.

This map shall be prepared in accordance with the following:

(a) The preliminary line shall be shown in red.
(b) Any projected lines shall be lightly penciled in.
(c) Located lines shall be shown in black. (If more than one line is located, they may be shown in different colors other than red or that used for contours.)
(d) All water features shall be shown in blue.
(e) Contours and their elevations shall be shown in yellow for the five-foot intervals and in orange ink for the twenty-five-foot intervals.
(f) Buildings, fence lines, section lines, roads, pole lines, etc. shall be shown in black.
(g) All section lines, quarter lines, property lines, sub-division lines, creeks, rivers, lakes, springs, existing roads, railroads, canals, irrigation ditches and structures, pole lines, fences, orchards, gardens, cultivated lands, pastures and land of other kinds, and buildings shall be shown. In short, everything which may have any bearing on the location and construction of the road shall be shown. (See Sec. 5, Art. 15, for Sec. Ties.)

(h) The stationing shall be shown on all curve points. All bearings and curve data shall be shown.
(i) Show coordinates of all "P" Line angle points, all P. I.'s on "L" Lines and of all section corners, permanent monuments, etc.
(j) Mile posts shall be shown on all lines.
(k) The ownership of all property abutting on or adjacent to the survey shall be shown.
(l) All ties must be shown and corners that are tied should be marked "found". (See Sec. 5, Art. 15.)
(m) Show station of intersection with old roads and equation of stationing.
(n) Show complete information regarding all parts of the old right of way which is to be retained and which is not within the regular right of way lines. These parcels shall be accurately tied to the centerline of the new location and the same datum used as on the new location so that by reestablishing the revised centerline, the retained sections of the old right of way may be accurately relocated. (See under "Abandonments", Sec. 9, Art. 18.)
(o) Indicate proposed bridges, culverts, etc.

Article 7—400-Foot Detail Map

This map is to be made only when requested by the Construction Engineer. The purpose of this map is to obtain the relationship between various lines, with reference to local physical features of the country. All streams, buildings of importance, landmarks, section lines and corners, towns, etc., should be shown.

This map, if required, shall be made on hard copy detail paper.

Contours shall not be shown on this map. The elevation of summits may be shown.

Article 8—1,000-Foot Map

This map and a tracing of it shall be kept up to date by the field office as the survey progresses. It shall show all lines run and all major topographic features of the country traversed. This should include topographic features taken from other maps so that it may cover a considerably larger extent of the country than that immediately adjacent to the survey. Mountains, cliffs, etc., may be shown by hatching.

Article 9—Show Information Obtained from Plates, Etc., in Parentheses

All ties, etc., obtained from sources other than actual field work are to be shown enclosed in parentheses. Where there is a difference between the field and deed or plat records, both should be shown—the field work in the regular manner and the deed or plat data in parentheses.

Article 10—Vicinity Maps of Railroad Crossings for Public Utilities Commission

Vicinity maps and profiles shall be made at the time of the survey of all grade crossings and separations in accordance with the following instructions. This map is intended for the Public Utilities Commission only and is not to be confused with the vicinity map to be used in the design of the proposed structure.

(a) *Vicinity Maps for Public Utilities Commission*—A vicinity map showing the vicinity near the crossing for a distance of at least 1,500 feet each side of the crossing, along both the highway and the railroad. The scale shall not be smaller than 1″ = 200 feet and shall be made up on the standard 22″ x 34″ tracing cloth sheets. We believe that in most cases, except where the angle of crossing is nearly 90 degrees, that the map and profile can be made up on the standard federal aid sheet such as is used in making up our vicinity maps and profiles for the Bridge Department. Where the standard sheet cannot be used the map is to be made up on a plain sheet of the same size (22″ x 34″), and the profile may or may not be placed on the same sheet. In *no* case shall the size of the sheet for the map and/or profile be other than multiples of a standard letter size sheet (8½″ x 11″).

The following data shall be shown:

(1) Stationing of the railroad line or lines and the station at the intersection of highway.
(2) Stationing of the highway and the station at the intersection of track or tracks.
(3) The angle of intersection of the railway and highway. In case the intersection is on a curve or curves, the angle of the intersection of a tangent to the curves at the point of intersection shall be given.
(4) The right of way line of both the highway and the railway.
(5) The location of all farm, private or gated crossings within the limits of the map.
(6) The location of all telephone, telegraph and power lines, both along the highway and the railroad.
(7) The location of all buildings, trees, houses, barns and other obstructions to view within a radius of 600 feet of the intersection of the highway and the railway.
(8) The location of all block signals, whistle posts, crossing signs, approach signs or other signal devices or warnings in place on either the highway or the railway.
(9) The location of contour lines within a radius of 600 feet of the crossing. Contour interval 5 feet.

(10) By appropriate lines, the distances which the operator of a highway vehicle can see in either direction along the railway and discern the pilot of a locomotive from:

Points 50 feet each side of the intersection.

Points 500 feet each side of the intersection.

(b) *Profiles for Public Utilities Commission* —A profile showing the grade of the highway and of the railroad for a distance of at least 1,500 feet on each side of the crossing intersection shall be made; it may or may not be on the same sheet as the map. The scale shall be such as to clearly show the required information.

Article 11—Vicinity Map for Design Purposes

A vicinity map shall be prepared for each proposed structure. The sample standard vicinity map, which is a part of this manual, is to be studied in preparing vicinity maps.

The following data shall be shown in the manner described:

(a) A scale of 50 feet to the inch is desired, but this may be altered in order that all information may be contained on the standard size sheet.

(b) All vicinity maps shall be prepared on standard 22″ x 34″ tracing cloth sheets.

(c) Contours shall be shown at two-foot intervals, unless the country is of such nature as to crowd the drawing too much, in which case an interval of five feet may be used.

(d) Contours and their elevations shall be shown in yellow for the two or five-foot intervals and in orange for the ten or twenty-five-foot intervals, depending upon the contour interval used.
All information pertaining to grade lines shall be shown in red.
All streams, channels, etc. shall be shown in blue.
The toe of fills or top of cutbanks shall be shown with a broken line made with a soft pencil.
The alignment, buildings, character of terrain, notes, pole lines, pipe lines, ditches, etc. shall be shown in black.

(e) A three-line profile shall be shown for each proposed structure. These profiles shall be taken on the located centerline and at fifteen feet each side of centerline. All breaks in the ground surface shall be shown.

(f) Show both subgrade and finish grade lines. In this respect it is well to indicate the depth of surfacing to be used (or other form of construction to be employed in carrying traffic).
When a bridge is entirely on a horizontal curve, requiring superelevation, the grade line should be carried on the inside of the curve. When only a portion of the bridge is on a curve, the grade line should be carried on the outside of the curve, which results in lowering the curb on the inside of the curve.

(g) The proposed structure shall be indicated in soft pencil on the plan and profile. This shall include the station of the beginning and end of the structure and the location of the proposed footings and span lengths.

(h) A small scale vicinity map shall be shown on the map and profile sheet. This map should include enough information to clearly indicate the position of the proposed structure in relation to the surrounding country, as the distance to the nearest town, direction of flow of streams, etc.

(i) On railroad crossings be sure to indicate the elevation of the top of rails and top of ties at the points of intersection. On railroad crossings, the stationing of the railroad line or lines and the station at the intersection of the highway shall be shown, as well as the stationing of the highway at the intersection of the track or tracks. Also the angle of intersection of the railway and highway shall be given. In case the intersection is on a curve or curves, the angle of the intersection of a tangent to the curves at the point of intersection shall be given. On streams the elevation of high and low water shall be shown, together with the dates on which the recordings were made (if possible).

A profile shall be shown for railroads, streambeds and crossing roads. These shall be for such length as to give complete information for purposes of designing the structure. For railroads this distance shall be about five hundred feet each side of the crossing, and for streams a distance of about 1,000 feet upstream and 400 feet downstream.

(j) Subsurface indications shall be shown on the vicinity map. (See under "Soils", Sec. 12.)

(k) A report shall be prepared in full on "Bridge Construction Survey Data", Form No. 61, for each vicinity map prepared. Under Item 8, "Other Material Data", give the relative costs of embankment and rock for riprap.

(l) Give complete information on the existing structure if there is one.

(m) Give complete information as to the location of all water mains, sewer, gas, pole or power lines, etc.

(n) For bridges over navigable waters, the following information is required:

(1) Soundings one mile each side of the proposed structure.

(2) The Government datum plane used.

(3) Location of section corner.

(4) Direction of ebb and flow of tide at site and at one mile limit each way from the bridge.

(5) Elevation of mean low and mean high tides.

(6) Extreme high water if bridge is across tidal waters; if across non-tidal waters, extreme high water, ordinary boating water and low water.

(7) Highest elevation at which water has remained for five consecutive days.

(8) Show harbor lines if they have been established.

(9) The channel which is used for navigation should be indicated.

(10) If there is an existing structure, a sketch should be furnished showing type, span lengths and vertical and horizontal clearances provided for traffic.

Article 12—Profiles

(a) All profiles shall have the main title on the left end of the roll. A sub-title shall be carried on the outside of each end of the roll. (See Section 11, Article 1.)

(b) The typical section shall be shown on the left end of every profile.

(c) Profiles shall be platted on 10 x 10 cross section cloth.

(d) The scale shall be 100 feet to the inch horizontally and 10 feet to the inch vertically, except in extremely heavy work when the vertical scale may be increased to 20 feet to the inch.

(e) The following data shall be shown on each profile. Grade lines and data pertaining thereto shall be shown in red ink; all other items will be shown in black ink.

(1) Ground line.

(2) Grade line. Show the elevation and station of all grade summits and length of verticals. Show and mark both subgrade and finished grade lines. Adjustments for different depths of topping or surfacing should be made in the subgrade line. In the cases where the material in cuts or fills is poorer than in certain excavation areas, and it is desirable to excavate cuts low and to leave embankments low, and have the better material hauled in to top out such cuts and fills, the grade lines of such mark must show on the profile. The distribution of quantities and haul of such material must be shown separately from the normal distribution.

(3) The station of all curve points.

(4) Degree of curve, total central grade, length of semi-tangent, length of spiral, spiral angle and "a" value.

(5) Bearings of tangents.

(6) Equations.

(7) Mile posts.

(8) Bench mark locations.

(10) Names of streams and direction of flow.

(11) Towns and villages.

(12) The elevation and station of all intersecting streets, roads and railroads.

(13) The station, kind, size and length of existing culverts and siphons. Show whether they are to be removed, replaced, salvaged or lengthened. If replaced, give size, kind and length of new culvert or siphon. If salvaged, give disposition. If lengthened, give the end or ends to be lengthened as well as the kind, size and length for each end. Show trench and structural excavation for culverts, siphons, irrigation and drainage ditches, etc.

(14) Show station of each end, width and other necessary information to describe bridges, stock passes, undercrossings, etc. Show station of each end and dimensions of proposed new structures.

(15) Show distribution and haul of earthwork quantities on all profiles. Miscellaneous quantities such as borrow, channel changes, etc. shall be designated as such.

(16) The location, depth and findings of all test pits and tunnels.

(17) Show the equation in stationing at the intersection of old roads.

Article 13—Profile Summary

All quantities entered in the summary at the right hand of the profile shall be in soft pencil. All items anticipated in the construction of the project should be included on location profiles. On final construction profiles every bid item shall be listed and all items of "extra work" shall be shown separately.

Article 14—Show Data to Retrace Line on Location and Construction Maps and Profiles

In the preparation of the location and final construction records, it is of the unmost importance that the maps and profiles show all information necessary to reestablish line and grade

at any future time. Therefore, all references to the line, permanent monuments and bench marks must be clearly shown before maps and profiles will be considered completed.

Article 15—Show Quantities Necessary to Construct Drainage System

All items and quantities necessary to the construction of drainage structures shall be shown on location and construction profiles. This shall include structural excavation quantities, type of structure or culvert, concrete and metal reinforcement (for box culverts), trench excavation quantities for inlet and outlet ditches, etc.

Article 16—Construction Map and Profile

A set of prints of the unreduced Federal Aid Plans shall be submitted which will show in red ink all changes made in the plans during construction, and all reference points. Lambert coordinates shall be shown for all P.I.'s and for all property corners which have been tied to the line. Care must be taken that everything that was constructed, revised or changed during construction shows on the final plans. In cases where Federal Aid Plans were not made then such other plans as prepared for the job may be used in lieu thereof.

Sections of the old right of way to be retained must be clearly shown.

Form E-273—1M—11-46

(SAMPLE COPY)

OREGON STATE HIGHWAY COMMISSION

BRIDGE CONSTRUCTION—SURVEY DATA

For bridge over Sandy River Bridge No. ......

Located ...... (Distance) miles ...... (Direction) from at Troutdale (Nearest R. R. Station)
in section 25 (or between sections ......), twp. 1 N., range 3 E.

County of Multnomah Name and number of road Columbia River Highway

Local name of bridge Sandy River Date of report Feb. 16, 1948 Report by John Doe (Engineer)

(A) MATERIALS SURVEY

MATERIAL	Source of Supply	Haul to Site (Distance and Character of Road)	Estimated Cost (F. O. B. Site)
(1) Cement	Portland	15 mi. OK	
(2) Fine aggregate	Troutdale	0	
(3) Gravel for coarse aggregate	Portland	15 mi. OK	
(4) Crushed stone for coarse aggregate	"	"	
(5) Structural timber	"	"	
(6) Falsework timber	"	"	
(7) Piling			

(8) Other materials data The rock (500 feet east of the bridge site) could be crushed and washed for concrete.

(B) WATERWAY SURVEY

(1) Location and elevation of bench mark and datum used Brass Plate SW pier of R.R. bridge - Elev. 47.81

(2) Drainage area in acres 335,000 Character of watershed Mountainous

(3) Width, depth and cross-section of stream: (1) of flood stage 42 in 1894, and 33 in 1933
(Show by sketches if necessary) (2) at low water stage 17
(3) at ordinary stage 20

(4) Elevations (a) Lowest point in stream bed at bridge site 14 (b) Highest water 42
(c) Lowest water 17 (d) Highest ice ...... (e) Highest drift ......

(5) Frequency and duration of floods In June back-water from Col. River Season of year Fall & Winter

(6) Extent of drainage to be feared from ice or drift ......

(7) Will all flood water pass through new structure or will relief be afforded through highwater channels or over approach fills? (Illustrate by sketch) Will all pass through new structure.

(8) Is stream in general cutting or silting up and at what rate? Drifting sand.

(9) Is there any tendency for stream to shift laterally or to change its channel? No change except drifting sand within the main channel.

(10) Is there need of any of the following work in connection with construction of new bridge?
(a) Channel changes No. Except Beaver Creek.
(b) Enlargement or clearing of channel to afford more waterway No
(c) Bank protection, revetments, wingdams, etc. No
(Illustrate by sketches)

STATE PRINTING DEPT

(Back of Form E-273)

(11) Location of nearest existing structure over same waterway 400 feet north to O.W.R.R.&N. Co. give following data for this structure:
(a) Number and length of spans and approaches 3 - 150' thru rivited spans, 1 - 60' Girder.
(b) Waterway area produced by old structure 11,250 sq. ft.
(c) Is this area too small? No Is it too large? No
(d) Is there any indication of erosion around piers or abutments, of damage from ice or drift or of damage due to inadequate clearances of inadequate span lengths? No
(e) What is the elevation of the clearance line on this structure referred to same datum as used above 42

(C) FOUNDATION SURVEY

(1) Character of material composing stream bed and banks Sand

(2) Character of foundation material (give all data from soundings or borings) O.W.R.R.&N. Co. drove a 60 ft. pile without striking bottom. We drove 15 feet without solid base.

(3) Distance from stream bed to solid foundation material ?

(4) If piling have been driven into these strata at any point near at hand, furnish following data: (a) Character of driving 25 ft. into sand for Conc. footings. (b) Depth of penetration ......

(5) What type of foundations have been used on structure near by ......

(D) GENERAL DATA AND RECOMMENDATIONS FOR NEW WORK

(1) Total recommended length for structure and approaches, from sta. 516+80 to sta. 526+80 or 1000 feet.

(2) Number and length of spans recommended ......

(3) Can any of the approach structures recommended above be filled should the same prove economical? ......
If so, between what stations ......

(4) Type of structure recommended ......

(5) Width of roadway and number and width of sidewalks ......

(6) Recommended grade line (show by sketch) Shown on vicinity map.

(7) What is approximate cost of approach filling material per c. y. at this site? 0.30

(8) Will temporary bridge be needed or can traffic be detoured? No

(9) Recommended clearance for superstructure to permit passage of logs or drifts, etc. Clearance will be ample.
Elevation ......

(10) Are there any special conditions controlling the following:
(a) The spacing of any one or more piers No
(b) The length or vertical clearance of any one or more spans No
(c) The length or angles recommended for any special wingfall construction No
(d) The depth of any one or more footings Piling for footings.

(11) Are there any other special features to provide for?
Place highway bridge piers according to location of R.R. piers to accomodate current flow.

If the structure contemplated involves a grade separation with an existing railway or a crossing of a navigable waterway, special information must be furnished to cover same. Blank forms covering the specific data needed in this connection will be mailed upon request. Accompanying the above report should be submitted a map of the site on a sheet 22 x 34 inches, giving the data covered in circular letter dated March 14, 1925, in reference to vicinity maps. (Copies of this circular will be furnished upon request.)

CONVENTIONAL SIGNS

Form E-36—4M—11-46

Oregon State Highway Commission

TRAVERSE SHEET

County Hood River Section Cascade Locks - Viento Calculated by Stein
Highway Columbia River Line "Loc." Sheet No. 14 Checked by Kirkpatrick

STATION	CURVE DATA Degree	Angle	Tan.	Sub. Tan.	P.I. to P.I.	Calculated Course	Cosine	Sine	LATITUDE N.	S.	DEPARTURE E.	W.	CO-ORDINATES Lat.	Dep.
619+59.59 P.S.														
624+59.59 P.S.C. 625+14.88 P.I. 625+65.59 P.C.S.	2°30' C.L.	15°09'		555.29									740,233.46	687,315.20
630+65.59 P.T.			41.96		1534.21	N87°09'E	.0497214	.9987631	76.28		1532.32			
631+07.55 P.S. 636+07.55 P.S.C. 640+44.51 P.I. 643+83.38 P.C.S.	4°C.R.	51°02'		936.96									740,309.74	688,847.52
648+83.38 P.T.			20.31		1628.93	S41°49'E	.7452821	.6667493		1214.01	1086.09			
649+03.69 P.S. 652+03.69 P.S.C. 655+75.35 P.I. 659+02.65 P.C.S.	4°C.L.	39°57½'		671.66									739,095.73	689,733.61
622+02.65 P.T.														

SECTION 12. SOILS

Article

1. General.
2. Foundations for Structures.
3. Excavations to be Explored.
4. Embankment and Structure Foundations to be Explored.
5. Slide Areas to be Investigated.
6. Exploration and Slide Control Equipment.
7. Exploration Holes to be Refilled.
8. Soil Sampling and Tests.
9. Resident Engineer's Soil Exploration Report.
10. Compaction Tests.
11. Exploration of Quarries, Gravel Pits and Borrow Areas.
12. Granular Soils and Selected Rock to be Used in Subgrade.
13. Soils Section.
14. Geology Section.
15. Design of Subbase and Base Courses.
16. Disposition of Undesirable Soils.
17. Test Holes to be Indicated on Hard Copy Map.
18. Request for Funds for Subsurface Exploration.
19. Slide Control on Contract Work with State Forces.
20. Control of Unstable Slopes and Embankment Foundations.
21. Unstable Areas Adjacent to Railroads.
22. Problems Involving Soil Mechanics to be Reviewed.
23. Location of Culverts in Vicinity of Unstable Ground.
24. Soil and Geological Exploration Log.
25. Exploration Data to be Available to Contractors.
26. Surface Ditches above Cut Slopes.
27. Division Geologist and Soils Engineer to Prepare Monthly Schedule.
28. Control of Surface Water on Embankment Shoulders.
29. Rate of Drill Penetration to be Indicated in Drill Logs.

Article 1—General

The theory of soil mechanics has not progressed sufficiently to adapt but a small part of the field procedures to rules. However, it is believed that a knowledge on the part of the field engineer of the fundamentals of soil mechanics and the characteristics of the various types of soils will result eventually in better road design and construction methods.

To this end the field engineer first should familiarize himself with the various types of soils as contained in a given grading project or underlying a surfacing project. While it would be desirable to make borings or sink test holes frequently and make up a soil profile, it is realized that the funds allocated for engineering would not be sufficient to cover the cost involved in such a procedure. It is believed, however, that a fair idea of the general types of soils to be encountered can be obtained by making laboratory tests on soils obtained from a few carefully selected test holes, old road and railroad cuts, exposures in gulches, etc.

After having obtained a knowledge of the types and characteristics of the various soils and the topography of the country, the engineer will be in a position to adapt the design and construction of the project to the materials encountered.

If material heavy in clay or silt content is encountered in a cut, an effort should be made to distribute it either near the upper portion of a high fill or the lower portion of a low fill. This may generally be done by cross-hauling. Those materials containing a large amount of clay should not be placed in high fills when the moisture content is great enough to make the fills unstable. As soils of this nature do not drain readily by mechanical means, it sometimes happens that a partially completed fill, which has excess water, will collapse later when being completed. The critical moisture content cannot be definitely given for any certain soil, but some idea might be had by submitting soil samples to the laboratory, together with information on the height of fill.

The foundation of fills exceeding 15 to 20 feet in height should be investigated, and if the character and condition of the underlying soil cannot be otherwise determined, test holes should be sunk. It will usually be found that underground water coupled with high clay content or muck soils cause most fill foundation failures. The slope of the fill foundation also has a decided bearing on the stability. A system of deep trenches either above the fill or through the fill foundation will sometimes stabilize them. Care must be taken, however, to construct these trenches of sufficient depth to thoroughly drain the surrounding material. Fills constructed on muck or silt foundations, such as the tide flats of the coast section, may be stabilized from sliding by means of surcharge material placed

on each side, or by means of sand drains. Some research has been done by the Salem office on such conditions, and information may be obtained by writing to the Salem office.

Occasionally fills are built on ancient slides. If, through a study of the topographical features of the country, this fact is known, test holes should be sunk to determine the presence of undesirable soils or ground water, or both. If conditions are unfavorable for a fill foundation, it might be possible to reduce the height of the fill or drain the proposed foundation.

The tendence of certain soils to high capillarity effects both the height of the grade line and the amount of surfacing material to be placed to prevent frost action. While no definite rules establishing grade heights or thickness of surfacing for certain soils can be given, it is believed that a knowledge of this characteristic in a certain soil will lead to comparisons with other sections of highways where such trouble has been encountered and will assist in determining the depth of surfacing to be used on the project.

The effects of clay, even in very small quantities, in gravel or rock to be used as a base underlying oil surfacing is well known. A laboratory test of the minus ten mesh part of the sample should be made to determine the plastic index which should meet the standard specifications.

Many other problems dealing with soils come up in the ordinary grading and surfacing projects. It is urged the field engineers become familiar with the methods of classifying soils and obtain a knowledge of the characteristics of these various soils under action of traffic and the elements. Several books are published on this subject, i. e., "Engineering Properties of Soil" by Hogentogler, "Soil Engineering" by M. G. Spangler, and pamphlets have also been issued by the Bureau of Public Roads.

Article 2—Foundations for Structures

Subsurface indications shall be shown on all vicinity maps for structures. Such data may be taken by means of hand augers and probes or with power equipment.

Article 3—Excavations to be Explored

Each cut on a new location shall be explored by hand methods or with available power equipment.

Generally cuts up to 15 feet deep can be explored by hand methods. For depths beyond 15 feet power equipment is available through the Construction Engineer's office.

General cuts should have a minimum of three exploration holes, one hole being in the middle and one near each end of the cut.

Exploration holes should be extended 3 to 5 feet below subgrade or to material which is too hard to drill.

Article 4—Embankment and Structure Foundations to be Explored

All embankment and structure foundations shall be investigated. Particlar attention shall be made of foundations composed of excessive silts and organic matter.

Generally bridge foundations are explored with equipment and personnel operated by the Bridge Division, but occasionally Construction Division personnel operating power equipment in the area may perform such work for the Bridge Division. Contact with the Bridge Division should be made before such work is done in order that proper data for their particular needs are furnished.

On hillside embankments careful observation should be made of unusual moisture conditions. Drilling by power and hand methods should be resorted to when it is suspected that moisture is present. Treatment of handling such moisture shall be by means of a drainage system of pipe or French type drains or vertical holes drilled from benches and filled wtih sand, or by other means.

Article 5—Slide Areas to be Investigated

Each new project shall be investigated for potential slide areas. Should a slide area be of major proportions, information shall be given immediately to the Division and Construction engineers.

Article 6—Exploration and Slide Control Equipment

The Construction Engineer's office maintains and operates equipment for the purpose of subsurface exploration and slide control. The regularly assigned crews to the various equipment are operated under the supervision of the respective division engineers' organizations. Equipment operators working through the staff of the Construction Engineer are on a 40-hour per week basis; these crews are not allowed travel

time to and from Salem. Once construction staff drill crews start work in an area they shall operate on the same time schedule as other department personnel in the vicinity. Unsatisfactory operation of construction staff drill crews shall be reported immediately to the Construction Engineer's office.

The division organization shall see that sufficient work is lined up for the efficient operation of the drill crew.

The operation of equipment for exploration frequently requires the use of a bulldozer to prepare access roads to the drilling sites, also crossing of fence lines, and occasionally the felling of trees.

Resident engineers in charge of projects where such euipment is being used shall make prior contacts with property owners and obtain permission before entry is made.

Soil and geological exploration men will advise the resident engineer of the location of proposed drilling sites, together with contemplated routes and estimated damage involved, sufficiently in advance of the need, in order that clearance to enter may be obtained with minimum delay to the exploration work.

Article 7—Exploration Holes to be Refilled

After the necessary data have been secured from any exploration hole, it shall be refilled or left in such a manner that it is not dangerous to livestock or people who may happen to be in the vicinity.

Article 8—Soil Sampling and Tests

In sampling excavations, each type of soil encountered in each exploration hole shall be sampled, such samples shall be:

1. About 15 or 20 pounds to be shipped to the Testing Laboratory.
2. Small sealed container of soil for natural moisture determination to be sent separately to Laboratory for expedited testing.
3. A representative sample to be placed in a small bottle and given to the resident engineer in charge of the project, properly labeled.

The following tests shall be requested:

1. Liquid limit.
2. Plasticity index.
3. Wet sieve analysis for percent of total material passing 200-mesh sieve.
4. Specific gravity.
5. Percentage of silt in total sample.
6. Percentage of clay in total sample.
7. Optimum moisture and dry density with curve data.
8. Triaxial test at liquid limit.
9. Triaxial test at optimum moisture.
10. Triaxial test at plastic limit.
11. Resistance values for all triaxial tests.

On embankment foundations undisturbed samples shall be taken of the various soil types in each exploration hole. Such samples shall be taken from a sufficient number of locations so as to reveal the true condition of the subsurface condition of the foundation material. Generally the depth of exploration should extend to a depth equal to the height of the proposed embankment and more if the soil is questionable for support.

Equipment and men for this type of sampling are available through the Construction Engineer's office upon request. Consolidometer and triaxial tests shall be run on these undisturbed samples.

Necessary data for embankment foundations shall include:

1. About 15 pound sample of disturbed material to be used in constructing the embakment to be tested for unit weight of wet material.
2. Sample of disturbed material of the foundation soil.
3. Undisturbed samples for triaxial and consolidation tests.
4. Specific gravity.
5. Liquid limit.
6. Plasticity index.
7. Wet sieve analysis and percentage of total sample of material passing 200-mesh screen, % of silt and % of clay and smaller particles.

Article 9—Resident Engineer's Soil Exploration Report

Upon the completion of a survey the resident engineer shall prepare and submit with the project records one copy of "Resident Engineer's Soil Exploration Report". These forms are available upon request from the Construction Engineer's office.

Article 10—Compaction Tests

The division organization shall conduct tests for the checking of the compaction of soils on all major construction projects. Copies of the results of all such tests shall be sent to the Construction Engineer.

Article 11—Exploration of Quarries, Gravel Pits and Borrow Areas

All quarries, gravel pits and borrow areas shall be prospected and tested prior to actual purchase of the property. In this respect it is desired that options to purchase shall be taken prior to the actual exploration work.

Article 12—Granular Soils and Selected Rock to be Used in Subgrade

If soils containing a high percentage of granular soils retained on a 200-mesh sieve or an excess of dice rock or comparable material capable of being transported without excessive blasting is encountered on a project, such material shall be disposed of in the subgrade zone. The amount of such material to be disposed of in this manner will depend to a great extent upon the characteristics of the inferior soil over which it is placed. Such material will be considered as subbase, and the ultimate base course will be designed to cover the subbase course. In some instances with an excess of rock suitable as selected topping a leveling course will comprise the base course, leaving only the wearing surface which is determined from traffic conditions.

The cross-hauling of better soils and topping rock is encouraged within economic limits, it being the responsibility of the engineer making the survey to determine the economics and recommend such action as necessary through organized channels.

Article 13—Soils Section

Each division shall have an organization capable of identifying problems involving soils when and if they occur. Such men as comprise this organization shall be capable of directing soil exploration work within the division. They shall be versed in sampling procedure and familiar with the tests necessary to solve the problems involved. It is desired that problems involving soil mechanics be solved by the divisional organization, with such problems reviewed by the Soils Section of the Construction Engineer's staff.

The Construction Engineer maintains personnel who will act as consultants and will also check ultimate designs involving all soil mechanics problems.

Article 14—Geology Section

Each division shall have an organization devoted to the locating of material sources and geologic study of new locations. Such men as comprise this organization shall direct geological exploration and slide control work and be capable of interpreting the general geology of an area and identifying areas which are potential slide zones. When slide zones are encountered on a new project, a surface indication report shall be made immediately with copies being sent to the Construction Engineer.

Article 15—Design of Subbase and Base Courses

The depth of surfacing for all projects shall be designed by the Soils Section of the Construction Division.

A report will be prepared by the Soils Section which will recommend the depth of surfacing; substantiating evidence will be included stating the reasons for the designed thickness. Recommendations of this design will be made by the Construction Engineer and the Engineer of Materials; final approval will be made by the First Assistant State Highway Engineer.

Article 16—Disposition of Undesirable Soils

Undesirable soils are those with a high silt content, excessively wet, high clay content, and muck soils. Generally muck or organic soils should not be used in the roadbed, but should be wasted outside the slopes.

Silty soils are to be avoided in the subgrade zone. Such soils have an affinity for water and as such will change density with absorption of water, with corresponding decrease in strength for support of traffic.

Excessively wet, clay type soils generally are impractical to consolidate; hence, if left in the upper portion of a subgrade there untimately results a deformation of the pavement surface.

Undesirable soils should not be placed in the lower portion of hillside embankments or over swampy areas, as they do not permit free flow of water, which might become impounded under the fill. A granular type of material when available should be in the bottom portion of such embankments.

Undesirable foundations under an embankment shall be treated in the following manner:

1. If economical, undesirable soils shall be removed.
2. On hillsides cut-off or bench drains can be constructed for purpose of draining impounded water. These can be composed of rock, which might easily be available from the project.

3. Design shall be made for sand drains or counterweights or surcharges. Such design may be made by the field men but shall be reviewed by the Salem office.
4. Horizontal drains at base of hillside embankments.

Article 17—Test Holes to be Indicated on Hard Copy Map

All test holes which are made on a project shall be shown on the hard copy map. Data shown shall include the hole number and manner of making it.

Article 18—Request for Funds for Subsurface Exploration

Requests for funds for subsurface and geological exploration shall be made through regular channels. The request shall state that intended funds are for "Subsurface and Geological Investigation" and shall be prepared on Form E-39, Authority for Survey.

Article 19—Slide Control on Contract Work with State Forces

Anticipated special drainage to be performed by state forces on contract work shall be estimated and included as an item in the engineer's estimate. Requests for use of such money during the life of the contract shall be prepared on Form A-105, "Order for State Force Work Applying to Contract".

Article 20—Control of Unstable Slopes and Embankment Foundations

All unstable slopes and foundations for embankments should be revealed by the exploration program prior to completion of the plans for the project.

Article 21—Unstable Areas Adjacent to Railroads

All swamp lands and preexisting slide areas shall be investigated with extreme interest where such conditions are adjacent to railroads on new locations. A report shall be prepared in writing to the Construction Engineer's office immediately stating all conditions which are apparent. An exploration program shall be indicated.

Article 22—Problems Involving Soil Mechanics to be Reviewed

Problems involving soil mechanics may be initiated by and design made by personnel within the division organization. Such problems shall be submitted to the Construction Engineer's office for review and check of design.

Article 23—Location of Culverts in Vicinity of Unstable Ground

Culverts shall be placed against a hillside and not where an unstable or swampy condition prevails. A change from this design shall be an exception and not the rule. In any case, care must be taken that the embankment foundation is adequately drained by either additional culverts or drain tile.

Article 24—Exploration and Drill Crew Weekly Reports

The soils engineer or drill foreman in charge of each exploration or drill crew shall prepare a report on Form E-114, "Field Engineer's Weekly Report for Surveys Only". This report shall summarize the week's work. Copies shall be sent to Construction, Division and Resident engineers. These reports shall be received in the various offices on the following Monday for the week reported.

Article 25—Soil and Geological Exploration Log

All engineers and others involved in soil or geological exploration work shall prepare a report for each exploration hole drilled or dug. This report shall be prepared on Form E-334, "Soil and Geological Exploration Log". These forms shall be mailed to the parties indicated at the end of each day's work for the holes completed each day.

Article 26—Exploration Data to be Available to Contractors

The drill logs and samples of soil from the various drill holes are to be made available to prospective contractors who wish them for bid purposes and to the contractor who is awarded the subject project for his use in planning his work. Data other than physical tests, such as geological interpretations and academic opinions, are not to be conveyed to anyone unless it be with the forewarned statement that such data are for information of the Highway Department only, and the Highway Department does not represent that any part thereof is correct. Anyone using these drawings or data does so at his own risk as to the accuracy and correctness of the information contained thereon.

Article 27—Surface Ditches Above Cut Slopes

Ditches shall be constructed beyond the top of slopes on cut sections which may have excessive run-off or be composed of highly erosive soils.

Article 28—Division Geologist and Soils Engineers to Prepare Monthly Schedule

The Division Geologist and Soils Engineer shall prepare a schedule of proposed projects which need exploration work. Such report shall be made to the Division Engineer. A copy of this report shall be sent to the Construction Engineer.

Article 29—Control of Surface Water on Embankment Shoulders

Erosive embankment slopes shall be protected by means of oiled shoulders and ditches with suitable catch basins and lateral drains or other means of leading water down the slopes which prevent erosion. Such control methods shall be included in the project design.

Soils which contain a high percentage of silt or fine sand generally are erosive in nature. Questionable soils should be called to the attention of the Construction Engineer.

On contract work protection of slopes shall be provided by the contractor by ditches or other means during the life of the contract. Particular care should be taken to see that erosion does not occur during seasonal suspension of the project.

Article 30—Rate of Drill Penetration to be Indicated in Drill Logs

Personnel in charge of power drill shall indicate the rate of penetration in periods of time for the various formations encountered during the exploration work on each hole. Such data shall be indicated on the exploration log.

RESIDENT ENGINEER'S SOIL EXPLORATION REPORT

Prefix ..... Engineer ..... Highway .....

Date ..... Section ..... Class Roadbed .....

1. Have all major embankment foundations been explored .....

   Sampled? ..... If not, give stations of those not explored and sampled. .....

   .....

2. Have all major cuts been explored to subgrade zone or to hard material?

   Yes ..... No ..... If not, give stations of those not explored. .....

   .....

   .....

3. Are there any areas which appear to be old slide areas? Yes ..... No .....

   If yes, give stations. .....

   .....

4. Are there any swamp areas? Yes ..... No ..... If yes, give stations. .....

   .....

   .....

5. Are there any embankment foundations which need special design? .....

   a. Counterweight stations .....

   b. Removal of unstable materials stations .....

   c. Other methods stations .....

   .....

6. Have foundations been explored for major culverts? Yes ..... No .....

   If not, give stations and reasons .....

   .....

7. Are there any pockets of unstable soil adjacent to railroads which should be removed?

   Yes ..... No ..... If yes, give stations .....

   .....

8. Are there any areas which will need slope draining during construction?

   Yes ..... No ..... If yes, give stations .....

   .....

SECTION 13. CONSTRUCTION

Article

1. Relations Between Department Employees and the Contractor.
2. Resident Engineer to Plan Work With Contractor.
3. Instructions to Contractor to be in Writing.
4. Resident Engineer to Keep Close Contact With Construction Details.
5. Notification of Contract Commencement and Completion Dates.
6. Contractor's Payroll Affidavit and Summary Statement.
7. Pictures to be Taken During Construction.
8. Photographer Available for Limited Field Work.
9. See that Contractor Stores Blasting Materials Safely.
10. Check Amount of Powder Used.
11. Protect Adjacent Property During Blasting.
12. See That Obstructions are Removed From Right of Way.
13. Check Bridge Grades to Fit Grading.
14. Change of Contract Terminus.
15. Extensions of Contract Time Limits.
16. Changes in Specifications.
17. Holiday Suspension of Construction Operations.
18. Projects to be Marked for Prospective Bidders.
19. Conducting Prospective Bidders Over Project.
20. All Trucks to be Licensed.
21. Contractor Shall Comply With Existing Laws.
22. State Forester to be Notified Prior to Clearing.
23. Confine Contractor's Operations Within the Right of Way.
24. Record to be Kept of Material Received on the Job.
25. Operation of Contractor's Equipment Across Railroad Tracks.
26. Compaction of Embankments.
27. Keep Close Check on Grading Quantities.
28. Detail Quantities to be Computed on Final Estimate.
29. Local Soft Places to be Stabilized.
30. Selection of Stabilization Material for Subgrade.
31. Shoulder Construction.
32. Flagmen to be Courteous.
33. All Detours to be Approved by State Highway Engineer.
34. Sub-contracts With Contractor.
35. Abandoned Right of Way to be Barricaded.
36. Markers to be Placed at Each End of Federal Aid Projects.

Article

37. Claims Against Contractors' Bond for Materials and Labor.
38. Engineer to Keep Accurate Costs on Project.
39. Inspectors' Authority.
40. Inspectors to be On Job and Constantly Check Work.
41. Inspectors to Study Plans and Specifications.
42. Mixes Shall Not Be Changed by Field Men.
43. Inspection of Subgrade.
44. Check Installation of Forms.
45. Production of Materials.
46. Sample to be Sent to Engineer of Materials.
47. Portland Cement Concrete Pavement.
48. Air Entraining Admixtures for Concrete.
49. Cement Adjustment.
50. Inspector's Report.
51. Asphaltic Concrete Pavement.
52. Macadam or Gravel Base.
53. Oiling.
54. Remove Warning Signs When no Longer Needed.
55. State Employees to Use Warning Signs.
56. See that Signs are Intelligently Placed.
57. Construction Jobs to be Signed by Contractor.
58. Project Signs to be Placed by State.
59. Standard Signs.
60. Permeability Tests.

Article 1—Relations Between Department Employees and the Contractor

Relations with the contractor and his employees should be maintained on a friendly, courteous and businesslike basis.

Surliness or an overbearing attitude will not be tolerated. Friendliness should prevail, but familiarity should be discouraged.

Careful and competent supervision of a project is essential if the best results are to be achieved. Resident Engineers will guard against the use of methods or materials that might be prejudicial to the interests of the Department.

Department employees shall not engage in arguments with the contractor or any member of his organization. Disputed points should be referred to his superior for decision and until that is received, he should use his best judgment.

Highway employees should not place themselves under obligation to the contractor in any manner. Their judgment will be affected, and their value to the Highway Department impaired. Aggravated cases of this nature will be treated with disciplinary action or dismissal.

Article 2—Resident Engineer to Plan Work With Contractor

Before work on a project is started, the Resident Engineer should arrange to go over the work with the contractor and ascertain the latter's program and plan of operation. A schedule should be arranged for the work and when the job is under way the schedule should be maintained as closely as possible. The engineer should make certain that the contractor interprets the plans and specifications correctly and that his force and equipment on hand or en route to the job are adequate to perform the work satisfactorily.

Article 3—Instructions to Contractor to be in Writing

Instructions or formal orders to the contractor shall be contained in a letter setting forth the reason therefor. The Resident Engineers should remember that verbal notices are of no record value, and difficult to substantiate in court. Copies of written instructions to contractors shall be sent to the Division Engineer.

Particular care should be taken not to issue any instructions to the contractor, his superintendent or foremen which can be construed as assuming superintendence of his work.

In matters requiring immediate attention, the Division Engineer shall be notified by wire or telephone before action is taken.

Article 4—Resident Engineer to Keep Close Contact With Construction Detail

The Resident Engineer shall make frequent inspections during the progress of the work and assure himself that the work is being carried on in full compliance with the specifications. In going over the work he will give such orders as may be necessary and see that they are carried out.

He will assist the contractor in every way possible to carry on the work to advantage. To this end he will see that line and grade stakes are provided when and where necessary.

It is required that the Resident Engineer keep a watchful eye on all phases of the work, and if he sees where changes could be made which would be of advantage, he should take the matter up with the Division Engineer at once.

Article 5—Notification of Contract Commencement and Completion Dates

Resident Engineers shall hereafter give notifications of commencement and completion of work on contract projects, in accordance with the following instructions:

(a) Three separate notifications will be required for each project. The first is to be a notification of the commencement of work. The second is to be a notification of the completion of work. The third is to be a notification of the removal of contractors' equipment and plant.

(b) The notifications are to be made on Form No. E-233. Each shall be made in triplicate, one copy being sent to the Salem Office, attention of the Office Engineer or the Bridge Engineer as the case may be, one copy being sent to the Division Engineer and one copy retained by the Resident Engineer.

(c) The practice whereby resident engineers send notices of commencement and completion to W. H. Lynch, District Engineer of the BPR, is discontinued, and no notices or copies of notices are to be so sent hereafter. The notifying of the BPR will be attended to by the Salem Office.

(d) Notifications are to be submitted for State contracts as well as for federal aid contracts.

(e) The day to be reported as the day of commencement shall be the day on which workmen employed by the contractor or a subcontractor begin the erection of plant, the development of sources of aggregates, the clearing, or the performance of a construction operation called for by the contract. Commencement of the work of assembling, repairing or transporting equipment for the job, and the commencement, by a manufacturer or dealer, of the manufacture or delivery of materials, is not, ordinarily, to be considered commencement of the work.

(f) The day to be reported as the day of completion of work shall be the day on which the last details of work required of the contractor to bring the project to completion, are performed. *Additional days on which the contractor may work in dismantling and removing his equipment and plant should not be included as a part of the completion time.*

(g) The day to be reported as the day on which the removal of equipment and plant is completed shall be the day on which the contractor completes such removing of equipment and plant and

cleaning up of plant sites as is called for by the specifications.

(h) Notifications are expected to be submitted on the same day the commencement or the completion being reported on, occurs.

(i) Commencement and completion dates are to be definitely established at or before the time of notification is submitted and, having been established, shall be shown the same on all reports, estimates and other documents on which showings of the dates are called for. If any situation arises which requires a change in a date, after the date has been reported, the Division Office and the Salem Office should be fully advised.

(j) When an overrun of specified time limit occurs, the extension of time to be granted need be only sufficient to cover the completion of work as defined in paragraph (f) above. The extension need not cover the time required for the removal of equipment and plant.

(k) It is not to be construed that the "completion date" or "day of completion", as defined herein and as reported on Form E-233, is anything more than a date fixing the time beyond which no penalty for overrun of time limit will be charged. It is not to be confused with, or to be considered as, either the date of acceptance or the date on which the contractor's obligation under the contract expires. The "date of acceptance" for the contract is the date on which the Highway Commission formally accepts the work as completed.

(l) Formal acceptance of the work by the Commission will not be made until after the contractor has completed the removal of his equipment and plant and has cleaned up the premises in a manner acceptable to the engineer. Final payment to the contractor will not be made until after the formal acceptance has been made.

Article 6—Contractors Payroll Affidavit and Summary Statements

In accordance with regulations, each week the contractor and each subcontractor shall furnish to the Resident Engineer a sworn affidavit, with respect to the wages paid during the preceding weekly pay roll period. This affidavit shall be accompanied by a summary statement, in triplicate, with respect to employment, indicating for the pay roll period covered the total number of employees, the total hours worked, and the total amount earned. This statement shall also include the accumulated totals for the total hours worked and the total amount earned. This information shall be submitted on Form PR-100, which will be furnished for this purpose upon request, or upon any other form which provides for reporting identical information.

In addition to the weekly affidavit and accompanying summary statements, for the pay roll periods nearest to January 15, April 15, July 15, and October 15, the contractor and each subcontractor shall furnish five copies of a summary statement, with respect to employment, broken down, however, into the four classifications enumerated in Section III of the Additional Contract Provisions. Such summary statements shall be submitted on Form PR-200, which will be furnished for this purpose upon request, or upon any other form which provides for reporting identical information, and shall be in agreement with corresponding totals shown on the weekly summary statement, Form PR-100.

The submission by the contractor of pay rolls, or copies thereof, is not required, but it is desirable that the contractor continue to use pay roll form PRA-176 (Rev.), but the use of said form is not required. However in accordance with regulations, each contractor or subcontractor shall preserve his weekly pay roll records for a period of three years from the date of completion of his contract. The payroll records shall set out accurately and completely the name, occupation and hourly wage rate of each employee, hours worked by him during the pay roll period, the full weekly wage earned by him, any deductions made from such weekly wages, and the actual weekly wages paid to him. Such pay roll records shall be made available at all times for inspection by the contracting officer or his authorized representative, and the time books of the contractor and subcontractors shall be open to the inspection of the engineers at any time.

Resident Engineers shall submit the weekly affidavit, two copies of the accompanying summary statement (Form PR-100), and four copies of the quarterly summary statement (Form PR-200), to the Salem office.

No pay roll information will be required on "State" jobs where Federal Funds are not involved.

Article 7—Pictures to be Taken of Work During Construction

Pictures taken before, during and after construction are valuable as a record of the project

and for future reference, especially views of unusual conditions, unusual methods of construction or other interesting features.

Each Resident Engineer will send in at least six pictures of each project under his supervision, the pictures to be taken at such times and places as will show the most interesting or unusual features of that particular job. The negatives and one print of each are to be sent to the Construction Engineer. The Division Engineer will be supplied with a print also, if he so desires.

The date the picture was taken and the location by station or mile post must be placed in ink on the edge of the negative. The date and location should also be placed on the back of the print with such other description or information as is necessary to describe the picture.

If no camera is otherwise available, the Resident Engineer is authorized to rent one, at a nominal cost, for a few days and carry the cost on his expense account.

The cost of the films shall be carried on the Resident Engineer's expense account.

We have in our organization a photographic laboratory and an expert photographer on our pay roll for full time work. In order to make full utilization of these facilities, all pictures taken in the field of construction work shall be sent to the Construction Engineer with a request for developing and printing.

If personal pictures are included in a roll of film along with construction pictures the film will be developed but prints will not be made.

Article 8—Photographer Available for Limited Field Work

In addition to laboratory work, such as film development, printing, etc., the photographer will be available for a certain amount of field photography. However, in order to avoid interference in scheduling, all requests for the photographer's services shall be made to the Director of Travel and Information, under whose direction the photographic laboratory is operated.

Article 9—See that Contractor Stores Blasting Material Safely

Although the contractor is entirely responsible for injury and/or damage to persons or property that might occur by reason of storing, handling or the using of explosives it is suggested that he be cautioned to keep his powder house locked at all times and to use every possible precaution to guard against accidents of any kind.

Blasting caps shall not be stored in the vicinity of radio transmitting stations, or of portable two-way radios.

Article 10—Check Amount of Powder Used

In rock excavations and other places where blasting is necessary, a careful check should be made of the amount of powder used in each cut or unit of the job.

Article 11—Protect Adjoining Property During Blasting

When any utilities are endangered by the contractor's blasting operations, the Resident Engineer will be personally responsible for notification to the owners. He shall personnally contact any telephone, telegraph, or power line companies and advise the local men in charge of all contemplated blasting operations and secure their approval before any blasting is undertaken which might jeopardize their operation.

With particular reference to railroads, it shall be the duty of the Resident Engineer to notify the Division Engineer or Superintendent of the railroad of any blasting contemplated wherein railroad property would be endangered and ascertain from them the hour at which such blasting may be undertaken and what manner of flagging will be necessary to protect the railroad's interests. Instructions given by officials of the railroad, regarding blasting which might involve their property, shall be followed explicitly.

Under no circumstances shall the contractor be permitted to blast until the above conditions have been met.

It shall also be the duty of the Resident Engineer to advise adjacent property owners of intended blasting operations when such operations will endanger personal property.

If the contractor claims to have negotiated as above in lieu of the Resident Engineer, this will not relieve the Resident Engineer of his responsibility and he must satisfy himself fully that all conditions have been met.

Article 12—See that Obstructions are Removed From Right of Way

The Resident Engineer shall see that obstructions on the right of way which interfere

with the contractor's work are removed. If owners are tardy in the removal of such facilities, the matter is to be called to the attention of the Division Engineer by letter stating the facts in full.

Article 13—Check Bridge Grades to Fit Grading

The Resident Engineer shall check the grade elevations of all bridges being built along his project and satisfy himself that the profile grade for the graded section will meet the grade of the structure. If differences of consequence are found the Division Engineer shall be promptly notified before changes are effected.

Article 14—Change of Contract Terminus

Requests for approval for a change of terminus of a contracted project must be submitted as soon as the necessity therefor becomes apparent, and in all cases prior to submission of the final voucher. This procedure will expedite payment of final claims.

The Department has consistently refrained from extending any projects, but there have been certain projects which were shortened slightly to balance material or make a more suitable connection to an existing road. Please see that the Construction Engineer is formally notified of any such change so that the request can be submitted to the Bureau of Public Roads in ample time.

Article 15—Extensions of Contract Time Limits

Our standard construction specifications covering both roads and bridges provide that in those instances wherein the contractor finds it impossible to complete the work within the time specified, extensions of time may be granted by the Highway Commission. The specifications, however, provide that these extensions shall only be granted upon written application made by the contractor to the Highway Commission, which application must be accompanied by the written consent of the contractor's surety.

Where an extension of time appears necessary, the contractor's written request, accompanied by the written consent of his surety, as provided in the specifications, should be received by the Salem Office in sufficient time to permit the Highway Commission to act upon such request before the expiration of the time limit given in the contract, together with any extensions thereto previously granted.

Since the Highway Commission is not in continuous session, these requests should be forwarded, through the Division Engineer, to the Salem Office at least thirty days in advance of the above expiration date.

Resident Engineers on construction are requested to watch this detail very carefully and initiate proceedings with their contractors in sufficient time to comply with the foregoing time limit.

At a recent meeting of the Highway Commission it was ordered that weather should be given consideration in recommending extensions of time to complete construction projects.

To that end, a daily record of the weather and the amount of delay caused therefrom should show in the resident's diary and this should be summarized on the back of each weekly report in the columns provided for that purpose differentiated from other delays.

Mimeograph forms are available for the contractor's request and the surety's consent; also a form for the recommendation of the Division Engineer. Sufficient forms to cover all of the contracts under his direction will be sent each Resident Engineer upon request addressed to the Construction Engineer. Three signed copies of the request and the surety's consent should be furnished the Division Engineer in each case.

Article 16—Changes in Specifications

The fact is emphasized that specifications on Bureau of Public Roads projects represent a contract entered into by the State of Oregon and the U. S. Government, and any changes in these specifications is in reality a violation of this contract. This makes it of vital importance that all changes in specifications or amounts must be approved by the B. P. R. before the change can be inaugurated.

Certain minor changes can be approved by the Portland office, other changes can be approved by the Regional office, others by the Chief Engineer, but changes which radically affect the contract can only be approved by the Secretary of Commerce.

It is, therefore, requested that the Construction Engineer be advised in an official manner of any and all changes which are contemplated in carrying out the contract so that the B. P. R. may be fully advised before they are started. Even though the Division, Construction or Highway Engineer has tentatively discussed these plans in the field, the Resident and Division Engineer should, as soon as the details and amounts

have been determined, advise the Construction Engineer by letter.

Article 17—Holiday Suspension of Construction Operations

Generally construction operations will be suspended on legal holidays if it is expected that there will be considerable volume of traffic through the project. However, if construction operations will not interfere with traffic it will not be necessary to suspend operations.

Usually if a holiday falls on a Monday the preceding Saturday afternoon and the whole day of Sunday shall be a period of no construction.

The approval of the Division Engineer is necessary before issuing orders to suspend operations during holiday seasons.

Article 18—Projects to be Marked for Prospective Bidders

All projects being advertised for letting are to be plainly marked in the field in such a manner that the project can be readily found and followed by the contractors and others who are interested therein.

The center line is to be brushed out so the line can be readily followed; the center line is to be staked and stakes plainly marked; right of way laths are to be set, with stationing on each.

The beginning and end of the project shall be plainly marked as well as all quarries, gravel, topping and special borrow pits and roads leading thereto.

Where the project cannot be looked over from a car, the road used to approach the project should be marked to show the entrance to the job. If the project parallels the old road it would be a convenience if stakes, with stationing and distance to the new line were placed at intervals, the distance between the stakes to depend upon the length of the job, etc.

Other important features might be marked, but this will be left to the judgment of the Resident Engineer as it is impossible to set a standard rule for all jobs.

As stated above, the object is to plainly mark the project so that it can be readily found and followed from end to end.

Article 19—Conducting Prospective Bidders Over Project

Some criticism has been received from the contractors that our Resident Engineers are not always available to show them over the prospective jobs. It is, therefore, suggested that on the days immediately prior to the letting, when it is anticipated that contractors will be viewing the job, the Resident Engineer arrange his work so as to be available. In case the Resident Engineer has not already been assigned, or is not familiar with the job, someone familiar with the work should be detailed as a guide for the contractors. The Construction Engineer should be notified at least a month prior to the date of the letting as to those available to conduct the contractors over the work.

Article 20—All Trucks to be Licensed

Please report to the Superintendent of Transportation, Public Utilities Commissioner at Salem, all trucks that are working on our projects for compensation which do not carry Oregon licenses and motor transportation licenses, or the P. U. C. plate.

Article 21—Contractor Shall Comply With Existing Laws

The contractor shall comply with all existing State, Federal and local laws in the operation of his contract.

Article 22—State Forester to be Notified Prior to Clearing

The contractor, before starting clearing, shall request a burning permit from the State Forester, giving a general description of the right of way to be cleared. If the project is in a national forest, request shall be made to the U. S. Forest Service. After a permit has been secured, the contractor shall proceed with clearing and burning in compliance with the terms of the permit.

Article 23—Confine Contractors' Operations Within the Right of Way

It is one of the duties of the Resident Engineer to see that the construction is carried on within, or confined to, the right of way. Where additional rights of way, encroachments and/or easements are necessary, the engineer shall obtain them through the Right of Way Department and shall keep the contractor off the

property until the right of way has been procured, or until satisfactory arrangements have been made with the owner and written permission has been received to enter upon said property.

Article 24—Record to be Kept of Material Received on the Job

The Resident Engineer should arrange to have a complete record of all asphalt, oil and cement received on the job. If the material is received by railroad, note the initial, number, kind of car, the date of arrival and of unloading and the condition of the material. Similar information shall be noted if other means of transportation is used. (See Sec. 17—Reports.)

Article 25—Operation of Contractor's Equipment Across Railroad Tracks

On construction projects adjacent to railroads the contractor and his superintendent shall be cautioned of the danger of moving equipment, especially caterpillar tractors, carryalls, tournapulls, etc., across tracks, particularly at points other than regular crossings.

Serious accidents may be caused by rails loosened or bent by heavy equipment.

The contractor is to be advised that when it is necessary to move equipment across tracks, especially at points other than at regular crossing, every possible care should be exercised to avoid any movement or damage to rails or roadbed and that he or his superintendent should, for safety's sake, notify some official or supervisor of the railroad before the equipment is moved.

Article 26—Compaction of Embankments

Special care shall be taken to see that proper compaction is obtained at points along the grade where the roadbed changes from cut to fill, and at places where fill material is deposited against previously compacted material or against structures.

Article 27—Keep Close Check on Grading Quantities

The Resident Engineer shall keep close check on the excavated materials to see that the shrinkage or swell factors which were used in making up the location mass diagram are correct. If too much variation occurs the Resident Engineer shall immediately notify the Division Engineer in writing and await his action before making any change. If the matter is urgent the Division Engineer shall be notified by telephone.

Article 28—Detail Quantities to be Computed on Final Estimates

The volumetric quantities of all material entering into the constructed project shall be determined by actual computations. All items which cost to exceed $2.00 per cubic yard shall be computed to the nearest hundredth of a cubic yard. Materials estimated on a square yard basis shall be computed to the nearest tenth of a square yard for unit costs under $2.00 and to the nearest hundredth if over $2.00 per square yard.

Article 29—Local Soft Places Shall Be Stabilized

Unsuitable material, causing local soft spots, shall be removed from the grade. Such spots shall be well drained and backfilled with gravel topping or rocky material. On surfacing jobs it will be necessary to submit Force Account or Price Agreement forms to perform this work.

Article 30—Selection of Stabilization Material for Subgrade

Selection of materials for road stabilization shall be made within the limits of the contract and shall be obtained so as to not incur additional cost except for the haul. If suitable material is not obtainable within the right of way, authorization for the additional cost involved shall be obtained in the regular manner.

Article 31—Shoulder Construction

Shoulders shall be built exactly to grade and line, no allowance shall be made for settlement.

Article 32—Flagmen to be Courteous

Flagmen shall always be courteous and have a pleasant demeanor when required to stop, control or give information to the public.

Contractors should be informed that traffic control men must meet the above requirements.

Article 33—Detours to be Approved by the State Highway Engineer

Complete plans must be submitted by a contractor who intends to detour traffic in any manner other than that specified in the contract or on the plans. Plans should include:

(a) Route shown on sketch map.
(b) Flagmen to be used.

(c) Care of roadway surface.
(d) Signs to be used and where.
(e) Reason for detouring traffic.

All detours must be approved by the State Highway Engineer before being put into use. Inclusion of a detour in the plans and specifications indicates that only the specified detour is approved. If others are considered they must be approved as above. (See Sec. 13, Articles 55, 56 and 58.)

Article 34—Sub-contracts With Contractor

In general, five copies of sub-contracts shall be submitted to the Division Engineer, together with a letter of explanation and the Resident Engineer's recommendation. These copies are to be distributed as follows:

One copy for the Salem Office.
One copy for the Bureau of Public Roads or other government agency.
One copy for the Division office.
One copy for the Sub-contractor.
One copy for the Contractor.

It is advisable for the Resident Engineer to retain or make a copy of the sub-contract for his own files.

The sub-contract should refer specifically to the original contract and make the parts of such original contract that are pertinent to the sub-contract a part of the sub-contract.

New instructions are frequently issued in letter form regarding sub-contracts. Be sure the latest information is used.

Article 35—Abandoned Highway to be Barricaded

Whenever any part of an old highway is abandoned and not used because of the construction of a new line, barricades shall be erected so that it cannot be used by the general public.

Article 36—Markers to be Placed at Each End of Federal Aid Project

Resident Engineers shall place a temporary marker of sufficient dimensions to be readily seen from the roadway, at each end of Federal Aid projects under their supervision, as soon as the project is completed. The Division Engineer is then to be notified by letter that the temporary markers have been set and the following information supplied:

Station at the beginning of the project.
Federal Aid number and prefix.
Station at the end of the project.
Permanent markers will be set by the Sign Department.

Article 37—Claims Against Contractors Bond for Materials and Labor

Claims against any contractor for materials, labor, supplies, etc., must be filed with the Secretary of State within 6 months after acceptance of the completed contract by the Highway Department. For further information regarding claims of this sort, reference is made to "Oregon Road Laws" under "Public Contracts" or Oregon Code 67-1101.

Article 38—Engineer to Keep Accurate Costs on Project

It shall be the duty of the Resident Engineer to keep an accurate account of all engineering costs on each project under his control. These costs are to be entered on all required reports in the proper places. (See under Weekly Report and Monthly Project Cost Reports, Section 17.)

The amount of work completed under contract shall be determined by actual measurement and observation in the field. (See under Monthly Estimates", Sec. 17.) Attention is called to booklet "Account Numbers for Distribution of Costs", these booklets explain the cost keeping system employed by the Highway Department and give account numbers to be used when distributing charges to any job or project. Copies of this booklet may be obtained through the regular requisition channels.

Article 39—Inspectors Authority

Inspectors on construction projects shall follow the instructions and methods set forth in Technical Report No. 43-1 "Manual of Standard Practice for Paving Inspectors" and Technical Report No. 43-2 "Manual of Standard Practice for Sampling Construction Materials."

All inspectors on a construction project, except inspectors who are assigned to a project by the Engineer of Materials, shall work under and report directly to the Resident Engineer. Men who are assigned by the Engineer of Materials shall report to him, but they shall also confer with the Resident Engineer. The inspectors shall have authority to enforce the specifications, and if differences arise with the contractor the matter shall be decided by the Resident Engineer, or if necessary by the Division

Engineer, whose decision shall govern. Inspectors who are assigned by the Engineer of Materials shall report differences with contractors to him but shall confer their differences with the Resident Engineer for his consideration.

Article 40—Inspectors to be On Job and Constantly Check Work

It is essential that the inspector be on the job at all times while construction operations are in progress. He must not leave the work in care of an assistant unless he has the Resident Engineers permission to do so, and the latter must know that the substitute inspector is competent to attend the work.

The inspector must not take anything for granted but shall check everything carefully. Most contractors endeavor to do what is right and do not resent constructive criticism or inquiry, but those who are opposed to careful inspection need watching all the more.

Article 41—Inspectors to Study Plans and Specifications

It shall be the duty of all inspectors to study the plans and specifications for the job to which they are assigned. If anything is found which is not thoroughly understood the Resident Engineer shall be consulted.

Article 42—Mixes Shall Not be Changed by Field Men

All mixes shall be computed and set by the Engineer of Materials, and under no circumstances may any field inspector change same, except on authority of the Engineer of Materials, or his headquarters representatives.

Article 43—Inspection of Sub-grade

The preparation of the sub-grade will be fully covered by the plans and specifications. Of considerable importance is the undesirable occurrence of local soft spots in the completed sub-grades. If places occur in the sub-grade that are weak, they should be immediately reported to the Resident Engineer who will take the proper action necessary. (See 13-29.)

Article 44—Check Installation of Forms

Usually the engineering party will check forms to see that they are set to proper grade and line, but following this check there usually occurs slight variations in the form lines due to trucks, rollers, gaps left open for trucks, etc. It is the duty of the inspector at the point of depositing materials on the grade to see that all forms are true to grade and line.

Article 45—Production of Materials

An inspector shall be assigned to each crushing or rock production plant, except small plants which may be inspected on a part time basis.

It shall be the duty of inspectors assigned to a material production project to see that all materials produced to be later incorporated in the roadbed shall pass the specifications.

Form 87FF "Daily Plant Report—Bituminous Mixtures" shall be submitted by Plant Inspectors. Distribution is printed on the face of the form.

Article 46—Sample to be Sent to Engineer of Materials

It shall be the duty of the inspector in charge of any particular branch of inspection to obtain samples of material necessary for submission to the Engineer of Materials (See section "Materials and Tests"). These samples shall be turned over to the Resident Engineer for submission to the Testing Laboratory. (Refer to Technical Report No. 43-2 "Manual of Standard Practice for Sampling Construction Materials.")

Article 47—Portland Cement Concrete Pavement

Specifications for Portland cement concrete pavement are covered in Section 31 of the Department's "Specifications and Contract Agreement for Highway Construction."

Technical Report No. 43-1 entitled "Manual of Standard Practice for Paving Inspectors" and Technical Report No. 43-2 "Manual of Standard Practice for Sampling Construction Materials" contain valuable information concerning their respective subjects and all field engineers and inspectors shall provide themselves with copies of these manuals.

Article 48—Air-Entraining Admixtures for Concrete

Contract specifications for construction projects will not normally carry a list of approved air-entraining agents. They will carry a specification to the effect that the contractor shall furnish and use an approved agent.

Following is a list of air-entraining agents that, up to this date, are satisfactory for use on all State and Federal Aid Projects.

No.	Trade Name	Manufactured by	Address
1.	Aerolith	Sonneborn & Sons, Inc.	New York, N. Y.
2.	Airalon AEA	Dewey & Almy Chem. Co.	Cambridge, Mass.
3.	Ary-Trap No. 1	A. C. Horn Co., Inc.	Long Island City, N. Y.
4.	Ayr-Trap No. 2	A. C. Horn Co., Inc.	Long Island City, N. Y.
5.	Darex AEA	Dewey & Almy Chem. Co.	Cambridge, Mass.
6.	Durair	Techkote Co.	Inglewood, Calif.
7.	Kutwell 40	Esso Standard Oil Co.	New York, N. Y.
8.	Nacconal NR	Allied Chem. & Dye Corp.	New York, N. Y.
9.	Nacconal Z	Allied Chem. & Dye Corp.	New York, N. Y.
10.	N-Tair	Newport Industries	New York, N. Y.
11.	Portite	Hopper Products, Inc.	New York, N. Y.
12.	Pozzolith 4A	Master Builders Co.	Cleveland, Ohio
13.	Pozzolith 5A	Master Builders Co.	Cleveland, Ohio
14.	Pozzolith 8	Master Builders Co.	Cleveland, Ohio
15.	Pozzolith 10A	Master Builders Co.	Cleveland, Ohio
16.	Protex AEA	Autolene Lubricants Co.	Denver, Colo.
17.	Ricco	Richards Sales Corp.	Jersey City, N. J.
18.	Santomerse No. 1	Monsanto Chemical Co.	St. Louis, Mo.
19.	Santomerse S	Monsanto Chemical Co.	St. Louis, Mo.
20.	Sika AER	Sika Chemical Co.	Passaic, N. J.
21.	Spray-O-Bond	Spray-O-Bond Co.	Milwaukee, Wis.
22.	Specs.	E. L. Moore Co.	Pasadena, Calif.
23.	Ultrawet 30E	Atlantic Refining Co.	Philadelphia, Pa.
24.	Ultrawet K	Atlantic Refining Co.	Philadelphia, Pa.
25.	Veriset	Verapon Inc.	New York, N. Y.
26.	Vinsol NVX	Hercules Powder Co.	Wilmington, Del.

Any product that does not appear on the approved list may be considered for use, provided the supplier will furnish the required samples for testing by the Bureau of Public Roads and highway department laboratories. No such product should be used until it is placed on the approved list.

Article 49—Cement Adjustment

Contracts are let on the basis that 1.54 bbls. of cement will be used in the mix. However, if during construction a value of less than 1.45 bbls. is used, an adjustment in favor of the Highway Department shall be made. If the amount of cement used exceeds 1.54 bbls. an adjustment shall be made in favor of the contractor.

To substantiate any cement adjustment figures, it is necessary that the inspector keep an accurate account of all cement delivered to the job, including the date, manner of transportation (truck, railroad, etc.), name of freight car, number of car or driver of truck, etc. A slip shall accompany each shipment signed by a representative of the Materials Department, this slip shall be turned in to the Resident Engineer immediately upon receipt of the cement. (See 14-2 Price Agreements.)

Article 50—Inspector's Report

Form E-81 "Concrete Paving Inspector's Daily Report" shall be prepared by the inspector. All items on this report shall be properly made out. Be sure to have the cement count O.K.'d by the contractor or his representative. Under "sacks estimated" use the value of 1.54 bbls. per cubic yard, expressed in equivalent sacks per panel (dist. between expansion joints).

Article 51—Asphaltic Concrete Pavement

The construction of Asphaltic Concrete Pavement is covered in the Highway Department's "Specifications and Contract Agreement for State Highway Construction" and in Technical Report No. 43-1 "Manual of Standard Practice for Paving Inspectors." Copies of Technical Report No. 43-1 may be obtained from the Engineer of Materials, Salem.

Article 52—Macadam or Gravel Subbase

The construction of gravel or macadam subbase lends itself to the individual effort of all persons on a construction party. Set rules are practically impossible. Individual experience is of prime importance. A mention of a few points, which have been found most practical in this type of construction, follows:

(a) Be sure that the sub-grade is in proper shape before any gravel or crushed rock is placed in it. All rolls should be taken out of the grade.

(b) Every weak place shall be stabilized by removing poor materials and replacing them with desirable materials. (See Sec. 13, Art. 29.)

(c) Computations shall be made as to the exact amount of surfacing to be placed on the sub-grade. These figures should be reduced to the amounts necessary for a 100′ section.

Material shall be spread uniformly on the sub-grade; piling materials shall not be permitted. Material accidently piled shall be spread properly before well spread sections are bladed.

(d) It is sometimes useful to withhold a small percentage of material composing various lifts in subbase to be used in spotting out low places that develop during the rolling operations. No attempt should be made in this manner to decrease quantities, the point being that a reserve is developed for final leveling of each lift.

In subbase composed of larger materials, it has been found most practical to remove at random a few large key rocks during the rolling operations as a method of eliminating small humps in the surface. The practice of disturbing the entire surface by rakes or picks has proven unsatisfactory, as it is extremely hard to guage necessary amounts after the surface is so disturbed.

(e) In regard to the placing of finer materials on the surface of a heavier base, it has been found that the best practice is to dampen the surface of the heavy base and apply thin layers of the fine materials together with additional water, rolling to be carried on during the spreading operations.

A little experimenting on each individual project will suggest the amount of water to be used. The objective being that the finished product will be well keyed and rigid.

The initial application of water prior to placing of the fine acts as an agent to retard the sifting of fines to the lower regions of the heavier base course. Subsequent lays of fine materials combined with the watering tend to develop a dense base in which the materials are not segregated to the extreme.

(f) Blading operations on surfacing of this type are best carried on in such manner that materials are carried ahead to fill low places. A reverse trip should be made back over the same route, which will permit materials to be carried into low spots from the opposite direction. If blading is made continuous in one direction, it is very hard to eliminate local depressions in the grade as material is carried forward continually and the ultimate result is the construction of a long sag in the surface.

Good surfacing practice requires that the man in charge must observe closely the entire surface from the edges of the road and other vantage points. A casual inspection by traveling over the road in a car is impossible. When this type of construction develops a considerable rolling surface it is evidence that the inspection has not been thorough.

(g) Rolling should be continued throughout the application of materials to the point of complete compaction before succeeding layers are placed. A statement of the number of rollers required is contained in the specifications.

(h) Absolutely no material containing clay shall be incorporated in macadam construction.

Article 53—Oiling

Reference is made to Section 13-51 Macadam or Gravel Subbase.

A great deal of the datum contained in the above mentioned section is applicable to this type of construction. Additional references are made herewith to certain phases of this type of construction which have been found most useful.

(a) The specifications require certain temperatures in application of oil. These temperatures shall be taken at the point of application on the grade.

(b) Close watch shall be maintained to see that no oil is heated beyond the limits contained in the specifications.

(c) The application of 1% solution of soap may be applied in the amounts of 10% by volume on heavy type of bituminous Macadam Construction.

Article 54—Remove Warning Signs When no Longer Needed

It shall be the duty of the Resident Engineer to see that all warning signs that are no longer necessary are promptly removed or covered up.

Article 55—State Employees to Use Warning Signs

State employees shall at all times protect themselves and the traveling public while working on the traveled portion of a highway, by the use of proper signs placed in such a way as to give the desired warning to the traveling public, without being dangerous to travel.

If on heavily traveled roads it becomes necessary to place protecting signs in the middle of the traveled portion of the road, it may also be necessary to use a flagman.

If proper signs are not at once available flagmen are to be used.

Article 56—See That Signs are Intelligently Placed

Detours shall be properly signed and the signs shall be placed in such a manner as to be easily read and interpreted by the motorist.

Article 57—Construction Jobs to be Signed by Contractor

Our highway construction contracts contain provisions obligating the contractor to erect suitable barricades wherever necessary to protect the traveling public and to provide suitable warning signs, danger signals and signs to direct traffic. There is also given some other detailed information in respect to these obligations.

In some instances the department has erected and maintained such signs and warning devices independent of the contractor. This practice should be discontinued, as we have been advised by the Commission's attorney against this practice for the reason that the contractor may become careless with respect to his obligations, and may assume that the Highway Commission has taken over this detail and has assumed the responsibility for erecting and maintaining all necessary warning signs, barricades and other safety devices.

If it is necessary to guide and direct the public away from a road that is under construction and to direct them to a recognized detour, the attorney advises that the department may erect such directional signs as are necessary to accomplish the result; but that the contractor should be notified in such instances that he is not relieved from any of his contractional obligations. Any signs which the Department may put up to direct the traffic to the proper detours are supplemental and not in lieu of the signs and warnings to be put up by the contractor. In other words, it must be made plain to the contractor, that any directional signs which the Department may place for the convenience of the traveling public, should not be taken as an assumption of the responsibility imposed upon the contractor. The Resident Engineer should see to it that the contractor complies specifically with his obligations with respect to protecting the traveling public by the erection of barricades and other safety devices.

Article 58—Project Signs to be Placed by State

A project sign is to be placed at each end of construction projects if traffic is to be disturbed in any way.

These signs are to be requisitioned in the regular manner and will be installed by the Sign Department unless specified in the contract to the contrary.

Article 59—Standard Signs

If it is required that a contractor have signs placed on a project, they shall conform to the State Highway Department's standards and, if desired, may be purchased from the Highway Department Sign Shop at cost. Payment for signs purchased from the Sign Department shall ordinarily be made direct by the contractor and not deducted from the estimate.

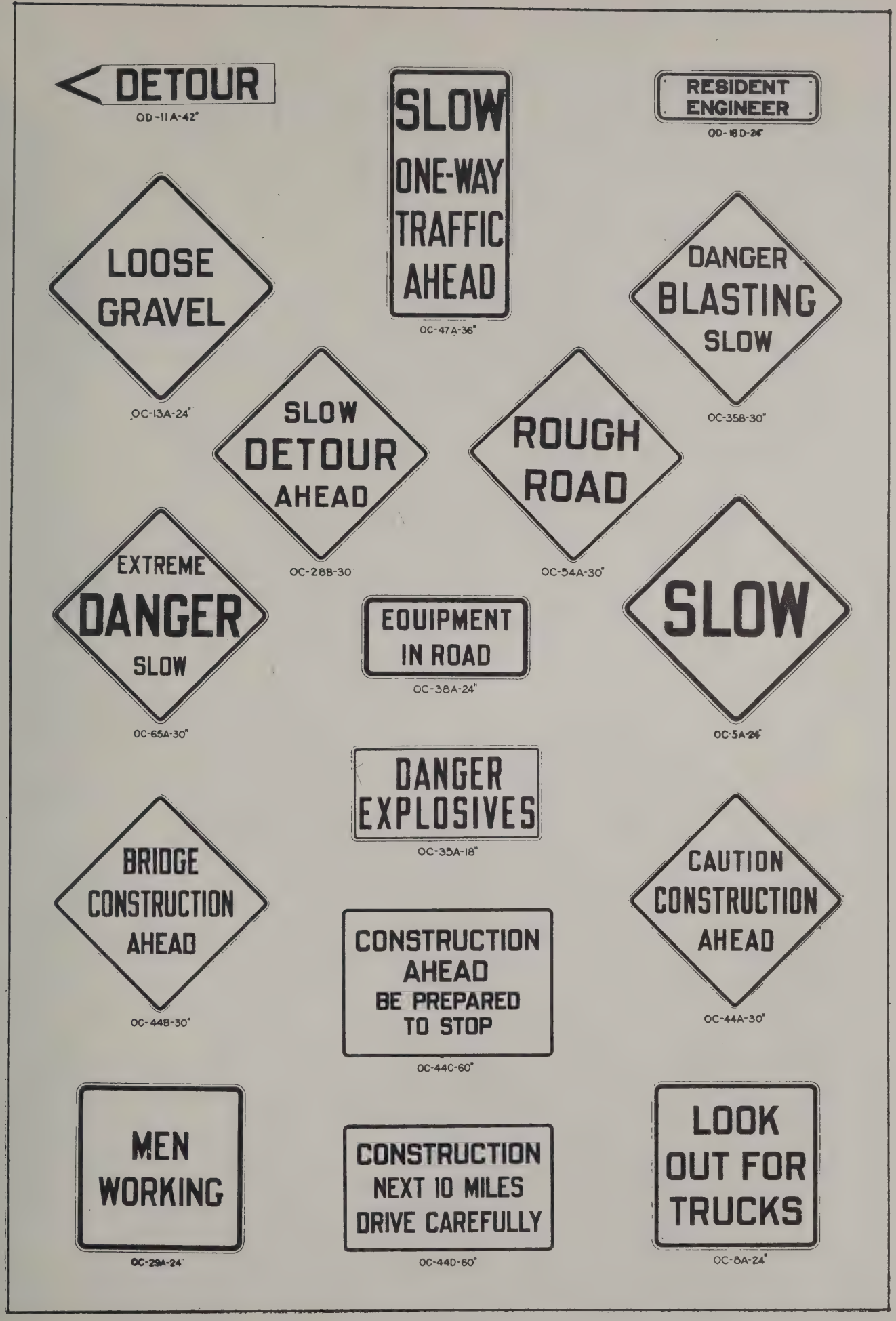
The following signs are standard. Additional information may be obtained from the Assistant Maintenance Engineer, Sign Department, at Salem.

Article 60—Permeability Tests

Permeability tests shall be made by division personnel on all paving and oiling projects. These tests shall be conducted on all paving jobs on the base courses and top courses during and following construction.

Generally a leakage of 1,000 cc will not mean an unsatisfactory surface prior to traffic action. Should a pavement or oil surface show a leakage of approximately 200 cc after a reasonable traffic use, it may be necessary to seal the surface. The Construction Engineer shall be notified when this condition has been found or if excess leakage is indicated at an earlier date.

Copies of all permeability tests shall be sent to the Construction Engineer's office. Forms for reporting this test, together with the method of making the test, can be secured from the Construction Engineer upon request.


DETOUR
OD-11A-42"
SLOW
ONE-WAY
TRAFFIC
AHEAD
OC-47A-36"
RESIDENT
ENGINEER
OD-18D-24"
LOOSE
GRAVEL
OC-13A-24"
DANGER
BLASTING
SLOW
OC-35B-30"
SLOW
DETOUR
AHEAD
OC-28B-30"
ROUGH
ROAD
OC-54A-30"
EXTREME
DANGER
SLOW
OC-65A-30"
EQUIPMENT
IN ROAD
OC-38A-24"
SLOW
OC-5A-24"
DANGER
EXPLOSIVES
OC-35A-18"
BRIDGE
CONSTRUCTION
AHEAD
OC-44B-30"
CONSTRUCTION
AHEAD
BE PREPARED
TO STOP
OC-44C-60"
CAUTION
CONSTRUCTION
AHEAD
OC-44A-30"
MEN
WORKING
OC-29A-24"
CONSTRUCTION
NEXT 10 MILES
DRIVE CAREFULLY
OC-44D-60"
LOOK
OUT FOR
TRUCKS
OC-8A-24"

OREGON STATE HIGHWAY COMMISSION

Engineers Recommendation Regarding Contractors Request

FOR

Extension of Time to Complete Contract

Investigation has been completed regarding the request (see reverse side) for an extension of time within which to complete the following project:

Contract No. 1234 Contractor A. B. C. Const. Co.

Highway OREGON COAST

Section NORTH BEND - COOS BAY

Kind of Work Grading and Paving

It is recommended that such extension be granted as requested under the following terms and conditions:

It would appear to me that the Contractor has some justification for this extension of time due to the fact that he worked under very adverse conditions. There was, as he says, very much of a lack of skilled labor, shortages in cement, and other very adverse conditions under which the work was performed.

To make it worse, I feel that the Contractor lost a good deal of money on this project and I am in favor of acquiesing in this extension without penalty even though the engineering costs were rather excessive.

Recommended for Approval:

(signed)
Division Engineer

(signed)
Construction Engineer or Bridge Engineer

(signed)
State Highway Engineer

Contract No. 1234

Project designation F-141 (11)
State—Federal

Date awarded December 29, 1948

Work started June 3, 1949

Per cent completed 100% October 31, 1952
Date

Specified completion date October 31, 1950

Previously extended to October 31, 1951

Extension requested to October 31, 1952

Form E-320—3M—8-52

OREGON STATE HIGHWAY COMMISSION

Contractors Request for Extension of Time to Complete Construction Contract

Oregon State Highway Commission,
Salem, Oregon.

Date ....., 19.....

Gentlemen:

We, the undersigned, respectfully request an extension of ..... days time, from .....,

19....., to ....., 19....., within which to complete our Contract No. .....,
described as follows:

The above request is based upon the following reasons:

Respectfully submitted,

.....
Contractor

By .....

CONSENT OF SURETY

Date ....., 19.....

We, ...

....., as surety

on the bond guaranteeing the completion of the contract above named and listed, hereby join in and consent to said request for extension of time, and hereby agree to remain fully bound as surety in all respects as if the latest extended date hereinabove stated had been stipulated in the original agreement.

.....
Attorney-in-fact

(SEAL)

.....
Resident Agent

State Printing 60059

Form E-320—250—3-44

OREGON STATE HIGHWAY COMMISSION

NOTIFICATION OF COMMENCEMENT AND COMPLETION DATES FOR CONTRACT PROJECTS

Section Spring Mt. Contract No. 3816

Highway Fremont F. A. Project No. 137-C

County Lake Date of Award of Contract March 15, 1944

Contractor Johnson Bros. Specified Date of Completion Oct. 31, 1944

First Notification:

Commencement date April 9, 1944

Second Notification:

Completion date October 11, 1944

Estimate of date on which contractor will complete the removal of equipment and plant and the cleaning up of the site October 20, 1944

Third Notification:

Date on which contractor completed the removal of equipment and plant and the cleaning up of the site

Date April 9, 1944 Resident Engineer

Instructions: Use this form for reporting first, the date on which work under the contract is commenced; second, the date on which the work is completed and, third, the date on which the removal of plant and the cleaning up of the site is completed. Each date is to be reported separately and as soon as it becomes known. Each report is to be made in triplicate. The original copy is to be sent to the Office Engineer or the Bridge Engineer at Salem. The duplicate copy is to be sent to the Division Engineer. The triplicate copy is to be retained by the Resident Engineer.

STATE PRINTING DEPT.

Form E-31—2500 Sets—3-45

OREGON STATE HIGHWAY COMMISSION
MATERIALS DEPARTMENT

Concrete Paving Inspector's Daily Report

Report No. 42
Project Halsey - Harrisburg Section Prefix 22-1111
Highway Pacific County Linn
Contractor Porter W. Yett Contract No. 2686
From station 912+51 Date Dec. 5, 1944
To station 916+97

SUBGRADE: Location soft spots

CONCRETE:

				Total
Size panel	12'	x 44½'		
Sacks Est.		874		874
Sacks used		876		876

Proportions used: Mix by volume 1 : 1.35 : 3.00 Mix by weight 94 : 152.6 : 339.0
Slump: Maximum Minimum Average Brand cement Beaver
REINFORCEMENTS: Stations used
Quantity per panel Spacing longitudinal Spacing transverse 12 in 12 feet
FINE AGGREGATE: Per cent water by weight—1. 6% 2.
PAVEMENT: Width 12 feet Thickness 8 in. Type of joint—Expansion 3/4 in.
Contraction 1/4 in. Spacing of joint—Expansion Variable Contraction 15 feet
MIXING PLANT: Central or moving Mixer, type Rex 27-E
Capacity 8 sacks RPM 16 Time of mix 1 min.
CURING: Opened to traffic, stations
Covering, stations Watering, stations
NUMBER MEN: Mixing 5 Spreading and finishing 5 Sprinkling Covering 1
TIME OPERATED: 4 hours WEATHER: Fair
CYLINDERS: Total cast this date 4; Set No. 36; including 4 cyls. at sta. 915 cyls. at sta.
cyls. at sta. cyls. at sta. and cyls. at sta.

QUANTITIES	Previous	Today	Total	QUANTITIES	Previous	Today	Total
Pavement, sq. yds.	15,214	595	15,809	Cement, sks.	20,208	876	21,084
Driveways, sq. yds.				Cement, sks.			
Sidewalks, sq. yds.				Cement, sks.			
Curb and gutter, lin. ft.				Cement, sks.			
				Cement, sks.			
				Cement, sks.			
Dowels	275	11	286				
Tie bars	5,852	-	5,852				
Exp. Jt., lin. ft.	120	-	120				
Cont. Jt., lin. ft	8,832	348	9,180				
Sacks deducted							

Cement count OK (signed) Contractor

REMARKS:

(signed) Inspector

STATE PRINTING DEPT. MATERIALS DEPARTMENT COPY

Form STFF

MATERIALS DEPARTMENT—OREGON STATE HIGHWAY COMMISSION

DAILY PLANT REPORT—BITUMINOUS MIXTURES

Section Albany-Crabtree Corner Prefix 22-1114
Highway Santiam County Linn
Contractor Warren Northwest, Inc. Contract No. 2726 Date Aug. 6, 1945

TYPE OR CLASS OF MIX										SPECIFICATIONS				
Percent Mix			24%	26%	44%		Total		Mix	Sand Grading			Mix
Pass.	On	Dust	Bin 1	Bin 2	Bin 3	Bin 4	On	%	% Range	Sieve	Specification		%
½	¼			4 1.1	78 34.3		¼	35.4	26 38				
¼	10		5 1.3	81 21.0	12 5.3		10	27.6	22 30				
10	40		51 12.2	10 2.6	3 1.3		40	16.1		40	30	50	51.9
40	80		20 4.8	2 .5	1 .4		80	5.7	25 35	80	16	32	18.4
80	200		16 3.8	1 .3	3 1.3		200	5.4		200	16	32	17.4
200			8 1.9	2 .5	3 1.4		Pass	3.8	4 7	Pass	8	16	12.3
							A.C.	6.0	5 8				

TYPE OR CLASS OF MIX									SPECIFICATIONS			
Percent Mix							Total		Mix	Sand Grading		Mix
Pass.	On	Dust	Bin 1	Bin 2	Bin 3	Bin 4	On	%	% Range	Sieve	Specification	%

DISPOSITION OF MATERIAL										TIME ANALYSIS						
Type	Tons	Tons Rejected		Tons	Placed on Road	Sampled at	Mixed	Tons	Used	Hours Delay				Hours Operated		
Bin	Mixed	Road	Plant	Used	Sta. to Sta.	Sta.	As		As	Plant	Road	Weather	Total	Today	Previous	Total
"B"	661½		1½	660	347+30-390+50	375								11	186	197
Total																

Remarks: Material passing No. 200 slightly low

TEMPERATURE	Max	Min	Ave.
Mix	360	255	270
Agg			
Asph			

White copy to engineer of materials
Blue copy to division engineer
Yellow copy to resident engineer

Signed: (S) P.S. Deuber Plant Inspector

Form PR-100—Oregon
10M—11-52

U. S. Department of Commerce
BUREAU OF PUBLIC ROADS

Contractor's Report of Employment
Summary of Weekly Payroll

Week ending .....

State ..... Federal Aid Project No. .....
State Contract No. .....

	DURING THE WEEK	TOTAL TO DATE
Number of names on payroll		x x x x x x x x x x x
Total hours worked		
Total wages earned		

.....
(Contractor)

Reported by .....
(Signature)

.....
(Title)

State of .....

County of .....

I, ... (name of party signing affidavit), ... (title), being duly sworn, do depose and say: That I pay or supervise the payment of the persons employed by ..... (contractor or subcontractor), on the ..... (building or work); that during the payroll period commencing on the ..... day of ....., 19....., and ending the ..... day of ....., 19....., all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said ..... (contractor or subcontractor), from the full weekly wages earned by any person, and that no deductions have been made either directly or indirectly from the full weekly wages earned by any person, other than permissible deductions as defined in the regulations under the "Kickback" Act (48 Stat. 948) and described below: (Paragraph describing deductions, if any).

Signature and title .....

Sworn to before me this ..... day of ....., 19.....

[SEAL]

.....
(Notary Public)

My commission expires .....

Submit three copies.
Affidavit required on one copy only.

State Printing 62068

Form PR-300—Oregon

U. S. Department of Commerce
BUREAU OF PUBLIC ROADS

Contractor's Report of Employment

showing

Distribution of Pay Roll Data by Classifications

State ..... F. A. Project No. .....

Week ending ..... State Contract No. .....

CLASSIFICATION	NUMBER OF EMPLOYEES	HOURS WORKED	TOTAL WAGES EARNED
Executive and administrative			
Skilled			
Intermediate grade			
Unskilled			
Total			

.....
(Contractor)

Reported by .....
(Signature)

.....
(Title)

State Printing

SECTION 14. PROJECT AUTHORIZATIONS, EXTRA WORK, ETC.

Article

1. General.
2. Price Agreements.
3. Extra Work.
4. State Force Work (Contract Jobs).
5. Authorization Procedure for Construction Projects.
6. Industrial Ratings for Highway Work.
7. Contractor's Industrial Accident Ratings.
8. Project Authorization and Record of Work Orders.
9. Contractor's Euipment Rental Rates.
10. Orders Required for Service to be Rendered Counties, Cities, Etc.
11. Billing Procedure for Amounts to be Collected from Counties, Cities and Others.
12. Procedure for Furnishing Materials to Contractors.

PROJECT AUTHORIZATIONS, EXTRA WORK, ETC.

Article 1—General

Extra work to be performed or extra material to be furnished, which has not been provided for and included in the original contract agreement, must be authorized and paid for as a price agreement, on a cost plus basis, or by state forces.

(a) Authority for such additional work or material must be secured by the written approval of the Division Engineer, Construction Engineer and the State Highway Engineer, before it will be permitted to proceed in the field.

(b) The forms used for authorization of extra work and material are, for the most part self-explanatory and complete in themselves. However, it is to be particularly noted that each form must be completed in detail before approval will be granted.

(c) Every care must be exercised to estimate accurately the cost and quantity of the work to be performed under the order. If, at any time, the cost is in excess of the original amount authorized for any particular order, an additional order shall be submitted, accompanied by an explanation of the overrun.

(d) Each order shall include, in the space provided, a brief but comprehensive explanation concerning the work to be performed, setting forth the reason making it necessary to perform the work and stating why it is classed as extra work.

(e) Authorization data shall be supplied on each order and a request made for any additional amount necessary to cover the cost of the work proposed by the order.

(f) When two or more Federal Aid units or projects are included under one contract, reference shall be made in the heading on the form under "F. A. Project No." only to the project or projects to which the work applies.

(g) Field Engineers *must* obtain advance approval of extra work and state force work on contract projects.

In emergency situations, consent to proceed with the work in advance of approval of the order may be obtained by telephone. Such consent must, however, include the consent of the Bureau of Public Roads, if the work is on a federal aid project or other project in which the federal government is concerned.

The Federal Government does not participate in the cost of work which has not had advance approval of the BPR. This is important and doubly so on access road projects, flight strip projects and other projects not on the State Highway System.

Field Engineers are cautioned, also, that on federal projects not on the State Highway System there *must be* no overrun of the *original* authorization for the project. The Federal Government will not make reimbursement beyond the amount of the *original* authorization. Additional expense, and overruns which cannot be absorbed in the contingency allowance, must be paid for with State moneys. No State money is available for such purpose.

When work is started, or is to be started before the order for it is approved, the order must have stated upon it the date on which the work was started, or is to be started, and the dates on which the advance approvals of the Department and of the BPR were obtained.

Division Engineers must see to it that the foregoing instructions are carried out and must check all orders to see that they are properly and adequately prepared and that they have shown upon them the beginning dates and advance approval dates called for by the preceding paragraph. Division Engineers will be held strictly responsible for the carrying out of this order.

Article 2—Price Agreements (Form A-169)

(a) Recommendations for extra work, materials to be furnished or purchased, or other

items, to be performed and paid for under price agreement, including substitutions in contract items, cement adjustments, etc., shall be submitted for approval on Form A-169.

(b) Six copies of the form shall be prepared, and after the signature of the contractor has been obtained, all copies (including the original) shall be submitted to the Division Engineer. After approval by the State Highway Engineer, approved copies will be sent to the Contractor, the Division Engineer and the Resident Engineer. The original copy will be filed with the copy of the contract in the Salem office and one copy will be retained by the Office Engineer's Department.

(c) An accurate and complete description of the work to be done and the location by station numbers shall be included on the form. The name of the pay item, unit of measurement, estimated quantities and agreed unit price, shall be listed in the space provided, and listed in the same manner as comparative items are listed in the regular contract.

(d) *Specifications, Basis of Measurement, Pay Item, Etc.*—Definite reference shall be made to specification, basis of measurement, and other provisions relative to performance of the work.

(e) In instances where a price agreement is submitted for approval, covering the purchase of excess material, cement adjustments, etc., which in accordance with the standard specifications are to be paid for on the basis of the actual cost to the contractor, copies of invoices *must* accompany the agreement to support the agreed unit prices.

Price agreements issued to establish the prices at which cement adjustments are to be made should include itemized estimates showing how the agreed prices are arrived at.

If the price paid the cement manufacturer is f. o. b. any point other than the site of the work, the freight charge, the overland haul expense and all other expense involved in getting the cement to the site of the work, must be shown.

If the contractor takes advantage of cash discount on his cement purchases, the discount item must be shown.

If the cement is delivered in cloth sacks, the sack refund item must be shown.

If the cement is delivered in bulk, or in non-returnable bags, this fact must be stated in the agreement.

The agreement must be accompanied by a copy of the manufacturer's invoices showing the price paid by the contractor for the cement used on the job and, if the contractor pays freight on the cement, a copy of the freight bill, also, must accompany the agreement.

Details in regard to the quantities of cement involved in the adjustment need *not* be shown in the agreement.

Division offices will check all cement adjustment price agreement for compliance with the foregoing instructions, before forwarding the agreements to Salem.

(f) Whenever necessary, in addition to and supplementary to the explanation on the form, a detailed explanation shall accompany the price agreement, stating pertinent information relative to the work prices, etc., which it covers. This explanation shall be included in the letter of transmittal. Quantities for price agreements will be listed on the Estimate Form and "Monthly Project Cost Report" under the respective headings.

(g) In those cases in which it becomes necessary or desirable to make purchases from contractors of gravel or crushed materials other than those intended to have been furnished under the contract, such, for instances, as materials for a neighboring or future project or materials for maintenance purposes when the contract made no provision for maintenance rock, it will hereafter be the practice to make the purchases entirely outside of the contract; i.e., to make the purchases through the requisition and purchase order procedure rather than through the price agreement procedure.

The price agreement procedure will continue to apply to the purchase of materials left on hand at completion of contract and to the purchase of materials, other than those called for by the contract, which must be purchased to permit satisfactory performance and completion of the work contemplated by the contract.

Article 3—Order for Extra Work (Form E-208)

(a) Recommendations for work, classed as extra work, and to be performed by the contractor on a cost plus basis, shall be submitted for approval on Form E-208.

(b) Five copies shall be prepared and submitted to the Division Engineer. After approval by the Assistant State Highway Engineer, approved copies will be sent to the contractor, the Division Engineer and the Resident Engineer.

One copy will be retained by the Office Engineer's Department.

(c) This form shall include a brief and complete description of the work to be performed, a definite location by station numbers and, under "Estimate of Quantities and Cost", an estimate of cost, broken down to show costs for labor, materials and equipment, etc. (The estimate of cost will not be included on the *original copy* of the form. This copy, when approved, is forwarded to the contractor.)

(d) Particular care must be exercised to present an accurate estimate of the cost of the work. The amount authorized for this work will not exceed that made for the original request.

(e) Under "Explanation", a statement shall be included setting forth the reasons for the necessity of performing the work and why it is classed as extra work. When necessary, this information will be supplemented by a detailed explanation included in the letter of transmittal.

(f) Force account work will be paid for in accordance with Section 8 of the standard specifications. Pay rolls shall be prepared and signed by the contractor, or his representative, and shall be approved by the Resident and Division Engineers. All bills must be properly supported by copies of invoices and bear the approval of the Resident and Division Engineers.

(g) Force account bills will be submitted with the monthly estimate and accompanied by Form No. A-100, Record of Extra Work Bills.

(h) Form No. A-100 will be submitted in quadruplicate. Corrections will be made thereon and copies showing the correct amounts will be retured to the Division Engineer and to the Resident Engineer. Corrections will be noted by the Resident Engineer and the corrected amounts used in preparing subsequent estimates.

(i) *Contractor's Payments Under State and Federal Acts*—In submitting force account bills for force account work performed, contractors may include the amounts paid by them under state and federal acts relating to "Social Security" and "Unemployment Compensation", as well as the amounts paid by them for state industrial accident insurance.

The contractor's payments under the Social Security Act for old age insurance amounts to 1.0 per cent of the gross amount of the labor pay roll.

The Contractor's payments under the Unemployment Compensation Act amount to 3.0 per cent of the gross amount of the labor pay roll.

In addition to allowance for the actual costs of these items, the contractor will be entitled to a "percentage allowance" of fifteen per cent of the actual cost, the same as is allowed on payments for industrial accident insurance and labor. (See Sec. 8-5 Standard Specifications and Contract Agreement for State Highway Construction.)

The employee's contributions under the above-mentioned acts, which will amount to 1.0 per cent of the gross pay roll, need not be shown on the force account pay rolls, either as deductions or otherwise, as they neither increase nor decrease the cost of the work to the contractor.

Article 4—Order for State Force Work (Applying to Contract Project) (Form A-105)

(a) Recommendations for work to be performed by state forces will be submitted on Form A-105. Written approval will be required from the Division Engineer, the Construction Engineer and the State Highway Engineer.

(b) Five copies of the form will be prepared and all copies submitted through the Division Engineer and Construction Engineer to the State Highway Engineer for approval. After approval by the State Highway Engineer, approved copies will be sent to the Division Engineer and the Resident Engineer. One copy will be submitted to the Maintenance Engineer and one copy retained by the Office Engineer's Department.

(c) *List Estimate of Labor, Materials, Equipment*—A brief and complete description of the work to be performed shall be included on the form, and the location of the work shown by station numbers. The estimate of cost and quantities shall be listed to show labor, materials and equipment. It will be expected that the estimate of cost is reasonably accurate, and approval of the order will constitute authority for expenditure only of the amount authorized thereon. When at any time it appears that an additional expenditure will be necessary, a request for the additional amount required is to be submitted for approval, accompanied by an acceptable explanation for the over-run.

(d) *Explain Reason for Necessity of Work*—A brief but comprehensive statement shall be included on the form, in the space provided,

setting forth the reasons for the necessity of performing the work, and why it is classed as extra work. Whenever the occasion requires, a detailed statement shall be included in the letter of transmittal, supplementing the explanation included on the form.

(e) *Other Bills Handled in Same Manner*—Bills submitted by public utilities or private companies for work done in connection with a construction project shall be handled in the same manner as "State Force Work".

(f) Force account work may be employed on Federal as well as State projects; however, reimbursement with Federal funds can only be requested for work performed after approval by the Bureau of Public Roads.

Article 5—Authorization Procedure for Construction Projects

At the time a project is contracted for, the Highway Commission will approve "authorizations" for the project as follows: Survey Authorization, Right of Way Authorization, Construction Authorization and Stockpile Authorization. The amounts of these authorizations can be increased only on the order of the Highway Commission.

Of the above authorizations only the construction authorization and the stockpile rock authorization will be of concern to the Resident Engineer. The following instructions will, therefore, apply to the construction authorization and the stockpile rock authorization, only.

The construction authorization will include, in addition to the contract amount, allowances for anticipated items of construction expense not covered in the contract amount, an allowance of 8 per cent for engineering and an allowance of 4½ per cent for contingencies. It will have subtracted from it those contract item costs and anticipated item costs, if any, which apply to stockpile rock. The amount thus subtracted will then constitute the stockpile rock authorization.

With respect to contracts which are strictly rock production contracts, the subtraction of stockpile rock costs mentioned in the preceding paragraph will not be made. Instead, the rock production cost will, for such projects, remain in and constitute the construction authorization the same as though it were a construction cost.

Subsequent to the awarding of contracts, Resident Engineers and Division Engineers will be provided with copies of form "Project Authorization and Record of Work Orders" (revised form A-139), on which will be shown the details and total amount of the construction authorization for the project.

Extra work and work by State forces will be handled on a work order basis as heretofore, but approval of the extra work order, price agreement or State force order will not operate to increase the construction authorization. Unless the extra work or State force work was contemplated and provided for in the constuction authorization or can be absorbed in the contingency allowance, the cost of the extra work or State force work will stand as an overrun of the authorization.

As soon as a construction job is well under way and each month thereafter, a careful check will be made of the original estimate to determine the probability of an overrun. It shall be the effort of the resident engineer and division engineer to avoid overrun of the authorization and to, when possible, hold the cost of the work materially below the amount of the authorization. On the Department's construction program as a whole there must be no overrun of the authorization total. There must then be underruns on some projects to absorb the overruns on others. Each engineer will therefore be expected to turn in his share of underruns, and there must be no planned build up of work for the purpose of using up the full amount of the authorization when otherwise there could be a saving. Overrun of the authorization will, of course, be permitted, when unavoidable.

Resident engineers shall keep continuous watch on the costs of his projects and, whenever it becomes evident that there is to be an overrun of the authorization, shall reflect that fact in his "estimate corrected to date" as shown on the Monthly Project Cost Report (Form E-256) of the following month.

In order that the estimate in the Monthly Project Cost Report may be compared directly with the amount of the construction authorization, all columns in the Monthly Project Cost Report (except when the sheet is for a rock production project) are to be subtotaled at the bottom of the last sheet and from those subtotals are to be subtracted the totals for "stockpile rock items" (including items such as preparation of sites as well as the rock items and haul items). The amounts shown on the "totals" line will then be the net totals for the construction items.

In an estimate, the total of which is greater than the amount of the authorization, the allowance for contingencies should not exceed four per cent of cost to complete the project unless there is some definite reason to expect that contingencies still to be encountered will exceed that percentage of the balance and that reason is noted on the sheet.

Whenever conditions arise on a project which call for changes in plans entailing materially increased costs, or whenever it develops that, without any material change in plans, the contract quantities and contract costs will be materially exceeded, the Resident Engineer shall submit Form E-299 (Authority to Overrun Contract Amount) at the earliest possible time. If a change in plans is proposed, authority must be secured in advance of the making of the change. If the situation so develops that further increases or overruns become necessary, supplemental authorizations shall be made for the additional funds required.

Article 6—Industrial Accident Ratings for Highway Work

From time to time the State Highway Engineer issues a statement giving the base accident insurance rates on the different classes of highway work. This statement is to be used in determining rates when submitting force account claims on State contracts and in connection with request for outside billing. Be sure you have the current statement of base rates when submitting force account claims.

Article 7—Contractors Industrial Accident Ratings

A statement of contractors' experience ratings is issued at the same time, and for the same period, as the statement of industrial accident ratings for highway work. This experience rating is based on the proportion of the contractors' payments which is paid by the State Industrial Accident Commission to the contractors' injured workmen and is shown as base rate or as an addition to or deduction from the base rates.

Each engineer should make certain that extra work order claims, in connection with contracts under his supervision, show both the correct base insurance rate of the contractor and the contractors' experience rating as listed in the current statement. Contractors' percentage should be allowed on insurance in all cases of force account claims.

All questions in connection with these instructions should be referred to the Accounting Division at Salem.

Article 8—Project Authorization and Record of Work Orders

Form A-139 will be made up in the Salem office and transmitted to the Division and Resident Engineers.

This form is designed to permit accurate knowledge of all authorizations on a project.

Article 9—Contractor's Equipment Rental Rates

Whenever arrangements are made for the performance of force account extra work by a contractor, an agreement shall be reached, before the work starts, as to the rental rates to be allowed for contractor's equipment. The rates agreed upon shall be stated on the "Order for Extra Work".

Equipment shall be of modern design, in good working condition. If old, obsolete or inefficient equipment is placed on the job, it shall be the duty of the Resident Engineer to order its replacement with efficient equipment.

Article 10—Orders Required for Service to be Rendered Counties, Cities, Etc.

Orders to provide service to counties, cities, etc., of the kinds mentioned below shall be issued on Form E-189, an "Order to Render Service."

(a) Work performed by survey parties or construction engineering crews under the supervision of the Construction Department.

(b) Work performed or materials furnished as a part of a state road contract or state bridge contract or supplemental to a state construction contract, under the supervision of the Construction Department or the Bridge Department.

Handling of Requests Made to Field Engineers—When counties, cities or others desiring service of the kinds referred to above make their requests to Division Engineers, Maintenance Superintendents or other Field Engineers, the requests should be transmitted by letter through the Division Office, to the Maintenance Engineer, the Construction Engineer or the Bridge Engineer, as the case may require. If the request is to be granted, an order on Form E-189 shall be prepared in and issued from the Salem headquarters office of the department having control of the work to be done. They will be

effective only when signed by the Staff Engineer or other engineer at the head of the department, or by his authorized assistant.

Orders will be numbered serially, each issuing office using a separate series of numbers and identifying its numbers by a prefix as follows:

Department	*Prefix*
Maintenance Department	MD
Signing Department	SD
Traffic Department	TD
Construction Department	CD
Bridge Department	BD

Copies of "Orders to Render Service" shall be distributed by staff engineer or department head having control of work to be done, as follows:

Original—To Office Engineer
Duplicate—Retained by Staff Engineer or Department Head
Triplicate—To Division Engineer
Quadruplicate—To Maintenance Superintendent or Resident Engineer.

Letters from Field Engineers transmitting requests for service should provide the following information:

1. Name and address of party desiring the service.
2. Name and title of person representing the party desiring the service.
3. Description and location of work to be done or materials to be furnished.
4. Estimate of quantities and cost.
5. Statement of reasons why department is called upon to render the service.
6. How payment for work is proposed to be made.
7. Amount proposed to be deposited as guarantee of payment.
8. Description of State work in conjunction with which proposed work could be done.

Article 11—Billing Procedure for Amounts to be Collected From Counties, Cities and Others

Whenever materials are furnished or service is rendered by the Highway Department to or for a County, City or other "outside" party it shall be the responsibility of the Staff Engineer or Department Head who is in charge of the Department by which the materials are furnished or by which the service is rendered, to submit to the Accounting Division, a "Request for Outside Billing" on Form A-191.

It will be the responsibility of the supervisory employee in direct charge of the rendering of service or the furnishing of materials to keep accurate account of the quantities and costs involved and to promptly submit that information through the proper channels to the Staff Engineer or Head of Department, as a basis for the request for billing above referred to.

The Accounting Division will prepare the invoices to be sent to the payer in every case and the writing up of invoices at other offices will not be permitted. The submitting of the invoice to the payer and the "follow up" to obtain payment, shall be understood to be the duties of the Accounting Division, except in those cases handled by the Legal Department.

The following detailed instructions are to be followed by Field Offices in preparing and submitting Statements of Quantities and Costs to be used as a basis for preparing "Requests for Outside Billing"—(a) Submit one copy of Form A-191, "Request for Outside Billing" to Staff Engineer, through the Division Engineer, being careful to fill in all blanks. This copy is for informational use only, as the official copies to be submitted to the Accounting Division will be prepared in the office of the Staff Engineer or Department Head.

(b) The itemized statement shall show complete information, including actual costs of labor, equipment, materials, and supplies, as follows:

1. Inclusive dates or date on which the work was performed.
2. Days or hours worked, and classifications and rate for men employed.
   (a) In computing the wage to be charged for monthly men, the daily rate will be 1/25 of the monthly rate, and the hourly rate 1/8 of the daily rate. This is to charge a just share of the Sunday and holiday salary to the work.
   (b) Vacation and sick leave percentages shall be charged at the regular current rates.
   (c) Industrial Accident Insurance shall be charged at the current rate applying to the particular type of work performed.
3. Rental for equipment shall be charged on a shift basis. Show the equipment number and the number of shifts.
   (a) Non-depreciated rental rates shall be used.
   (b) The rental rate to be charged for equipment for which there is no established shift rental rate shall be

1/25 of the monthly non-depreciated rental rate.

4. Materials, including asphalt, crushed rock, lumber, cement, etc., shall be listed in detail showing quantity, unit, unit price, and amount, plus an item adding 10 per cent of the material costs. This ten per cent charge is to cover shrinkage and loss of materials sustained in handling and should be shown as a separate item.
   (a) For asphalt used from State barrels, the charge will include the following: freight; cost of asphalt; ten per cent of the cost of asphalt and freight for shrinkage and loss in handling.
   (b) For asphalt sold from State storage sumps, the charge will include the following: freight; cost of asphalt; ten per cent of cost of asphalt and freight for shrinkage and loss in handling.
   (c) For asphalt sold to outside parties in their barrels, at the time of unloading and hauled by them, the charge will include the following: freight; cost of asphalt; ten per cent of cost of asphalt and freight for shrinkage and loss in handling.
5. Supplies, including gas, oil, grease, stove oil, kerosene, etc., shall be listed in detail showing quantity, unit, unit price and amount, plus an item adding ten per cent of the cost of supplies. This ten per cent charge is to cover the shrinkage and loss of supplies sustained in handling and should be shown as a separate item.
6. Aggregates are to be charged for at actual cost (not the standard price set for aggregates used on our own work).

(c) To cover the expense of supervision, general administration, and overhead, add a charge of ten per cent of the total cost on all work performed for outside parties, including repairs to damaged structures when the cost is to be received from the responsible party. This charge will be made in addition to the ten per cent charged for handling materials and supplies. It is to be shown on the next line below the total cost, and labeled "Plus ten per cent for Overhead".

(d) It is the purpose when billing for work performed for outside parties to charge them as nearly as possible the actual cost of performing the work. Field Engineers should never attempt to make the bill equal the exact amount of an advance deposit or some previous estimate, but should prepare the statement for actual expense data. In small projects where a lump sum estimate is used the fact should be indicated; but, in general the practice of showing lump sums should be avoided.

Article 12—Procedure for Furnishing Materials to Contractors

The procedure described below is to be followed in cases where the Department undertakes to furnish to a contractor, asphalt, steel or other materials which, under the terms of the contract, should be furnished by the contractor.

Evidence of Authorization—As evidence of authority to furnish the materials, the Resident Engineer will prepare and submit, in the usual manner, an "Order for State Force Work" (Form No. A-105). On this order, the work to be done will, of course, be described as the furnishing of the material.

This order must be submitted even though the furnishing of the materials has been authorized previously by letter or telephone.

Submission of Requisition—To obtain the materials for the contractor, the Resident Engineer will submit a requisition in the usual manner, stating on the requisition that the material is for the contractor, and that the cost is to be deducted from the contractor's earnings. In the cost distribution on the requisition, the prefix should be the prefix of the project on which the material is to be used, and the *account number must be the number 202. The use of number 202 is important,* as that number is used only for items chargeable to the contractor and acts as a flag to prevent any possibility of collection from the contractor being overlooked.

In case arragements for shipment of the materials are made through the Salem Office by telephone or other means prior to the issuance of a requisition, a requisition to confirm the order is to be issued by the Resident Engineer with clear indication that the requisition is in confirmation of the previously placed order.

Showing on Monthly Estimate Sheets—In order that proper charge may be made against the contractor for the materials furnished him, the Resident Engineer will list on each monthly or final estimate the quantities of materials furnished to the contractor to the date of the estimate. This listing of the materials shall be done on the back of the estimate sheet, in the space headed "Statement of Deduction Items."

Charge to the contractor for materials furnished by the State shall be made before, or at

the same time, payment is made to the contractor for the contract items in connection with which the materials furnished are used.

Freight on materials furnished, if paid by the State, shall be listed on the backs of the estimates in the same manner as materials.

For materials carried in Equipment Department storerooms, such as spring brackets and signs, the above-described procedure need not be followed. Instead, the materials may be requisitioned from the storeroom with instructions to the storeroom to charge the expense to the contractor, giving the name of the contractor and the contract number.

Materials (except signs) are to be furnished to contractors only in cases of unusual emergency, and, then, only with the advance approval of the Chief Engineer.

Form S-359—534—6-51

OREGON STATE HIGHWAY DEPARTMENT

SAMPLE COPY

Order for Extra Work

TO BE PERFORMED ON FORCE ACCOUNT BASIS

Project Name: Hauser-Coos Bay — Date: June 1, 1953

Highway: Oregon Coast — Contract No. 3900

County: Coos — Prefix: 6-1045

Contractor: C. R. O'Neil — F. A. Project No. BF-141 (13)

Address: Creswell, Oregon — Order No. 1

The following work is hereby classified as "Extra Work", to be performed and paid for in accordance with the terms of contract.

Description of work to be done:

Salvage & relay 300 lin. ft. of 3/4" water pipe. Furnish and place 75 lin. ft. of 3/4" galvanized water pipe.

Location by station numbers:

Rt. of Station 151+80

Estimate of quantities and cost:

½ cu. yd. shovel	12 hrs. at $8.90	$106.80	
75 lin. ft. 3/4" galv. water pipe	at 0.78	58.50	
Total			$165.30
Plus 5%			8.27
Total Iquipment Rental			$173.57
Labor, 4 men	48 hrs. at $2.10	$100.80	
Plus 15%		15.12	
Total Labor			$115.92
Total			$289.49

Explanation: (Explain here the conditions which cause this work to be classed as "extra work")

As per Right of Way Agreement with A. B. Dick, file 73524

INSTRUCTIONS: A single order should not cover more than one class of work or more than one extra work job.

Submit five copies of the order to Salem. After approval of the order by the assistant state highway engineer, the Salem office will send one copy to the contractor, one to the division engineer and one to the resident engineer.

Project authorization	$ 426,123.00
Present estimate of project cost, including $ 289.49 for work under this order	$ 410,248.88
Expected under-run ~~over-run~~ amount	$ 15,874.12
Expected under-run ~~over-run~~ per cent	3.73

Space to right of this line is for use of Salem Office

Submitted by: Resident Engineer — Approval Recommended: Construction—Bridge—Engineer

Approval Recommended: Division Engineer — Approved: Assistant State Highway Engineer

STATE PRINTING DEPT. 48126

Form A-109—534—12-49

OREGON STATE HIGHWAY COMMISSION

Order for State Force Work

APPLYING TO CONTRACT PROJECTS

Project Name: Hauser-Coos Bay — Date: May 29, 1953

Highway: Oregon Coast — Contract No. 3900 — F. A. Project No. BF-141(13)

County: Coos — Prefix: 6-1045 — Account No. 224

Description of Work To Be Done:

Seeding cut and fill slopes

Location by Station Numbers:

2+15 - 238+50

Estimate of Quantities and Costs:

Iquipment Rental	$ 200.00
Seed	870.00
Labor	430.00
	$1,500.00

Explanation:

INSTRUCTIONS

Submit a separate order for each piece or kind of state force work to be undertaken. Use the account number applying to that work as indicated in the account numbers assigned to state force work on contract jobs.

Five copies of the order are to be submitted to Salem. After approval by the Assistant State Highway Engineer, one copy will be sent to the Division Engineer and one copy to the Resident Engineer.

Project authorization	$ 426,123.00
Present estimate of project cost, including $ 1,200 for work under this order	$ 410,248.88
Expected under-run ~~over-run~~ (amount)	$ 15,874.12
Expected under-run ~~over-run~~ (per cent)	3.73

Space to right of this line is for use of Salem Office

Submitted by: Resident Engineer — Approval Recommended: Construction—Bridge—Engineer

Approval Recommended: Division Engineer — Approved: Assistant State Highway Engineer

This order does not constitute authority for expenditures until approved by the Assistant State Highway Engineer.

State Printing Dept. 36144

Form A-109—534—8-52

OREGON STATE HIGHWAY DEPARTMENT

SAMPLE COPY

Price Agreement

APPLYING TO EXTRA WORK AND EXTRA MATERIAL

Project Name: Hauser - Coos Bay — Date: May 10, 1953

Highway: Oregon Coast — Contract No. 3900

County: Coos — Prefix: 6-1045

Contractor: C. R. O'Neil — F. A. Project No. BF-141 (13)

Address: Creswell, Oregon — Price Agreement No. 1

For the below described extra work or extra material to be performed or furnished under the contract above referred to, the contractor agrees to accept payment at the prices given herein, understanding that, except as herein otherwise provided, the work is to be performed and the material is to be furnished in accordance with the specifications which form a part of the contract and in accordance with the instructions of the engineer.

Work to be done:

Install 12" concrete pipe

Locations by station numbers:

Lt. Station 83+17 to 83+67

Names of pay items, estimated quantities and agreed prices:

Install 12" concrete pipe, 60 Lin. Ft. at $2.50 per Ft. $150.00

Specifications, basis of measurement and other provisions:

Salvaged pipe to be furnished to contractor from maintenance storage at $0.75 per lin. ft. Pipe to be placed in accordance with Section 39-15 of the General Specifications or as directed by the Engineer.

INSTRUCTIONS

After the signature of the contractor has been obtained, submit six copies (including original copy) to the Salem Office. After approval by the Assistant State Highway Engineer, approved copies will be sent to the Contractor, the Division Engineer, and the Resident Engineer.

This order does not constitute authority for expenditure until approved by the Assistant State Highway Engineer or State Highway Engineer.

Project authorization	$ 426,123.00
Present estimate of project cost, including $ 150.00 for work under this order	$ 426,123.00
Expected under-run over-run (amount)	$ - -
Expected under-run over-run (per cent)	- -

Space to right of this line is for use of Salem Office

Submitted by: Resident Engineer — Signed: Contractor

Approval Recommended: Division Engineer

Approval Recommended: Construction—Bridge—Engineer — Approved: State Highway Engineer

State Printing 60748

Form A-109—534—8-52

OREGON STATE HIGHWAY DEPARTMENT

SAMPLE COPY

Price Agreement

APPLYING TO EXTRA WORK AND EXTRA MATERIAL

Project Name: Hauser - Coos Bay — Date: May 15, 1953

Highway: Oregon Coast — Contract No. 3900

County: Coos — Prefix: 6-1045

Contractor: C. R. O'Neil — F. A. Project No. BF-141 (13)

Address: Creswell, Oregon — Price Agreement No. 2

For the below described extra work or extra material to be performed or furnished under the contract above referred to, the contractor agrees to accept payment at the prices given herein, understanding that, except as herein otherwise provided, the work is to be performed and the material is to be furnished in accordance with the specifications which form a part of the contract and in accordance with the instructions of the engineer.

Work to be done:

To establish net price per barrel for cement, based on actual cost per barrel F.O.B. the job site.

Locations by station numbers:

152+50, 6' x 6' box culvert

Names of pay items, estimated quantities and agreed prices:

Santa Cruz Portland Cement F.O.B. Project (as per attached invoice)	$4.60 per Bbl.
Less cash discount	0.10
	$4.50

Specifications, basis of measurement and other provisions:

INSTRUCTIONS

After the signature of the contractor has been obtained, submit six copies (including original copy) to the Salem Office. After approval by the Assistant State Highway Engineer, approved copies will be sent to the Contractor, the Division Engineer, and the Resident Engineer.

This order does not constitute authority for expenditure until approved by the Assistant State Highway Engineer or State Highway Engineer.

Project authorization	$ 426,123.00
Present estimate of project cost, including $ ..... for work under this order	$ 426,123.00
Expected under-run over-run (amount)	$ .....
Expected under-run over-run (per cent)	.....

Space to right of this line is for use of Salem Office

Submitted by: Resident Engineer — Signed: Contractor

Approval Recommended: Division Engineer

Approval Recommended: Construction—Bridge—Engineer — Approved: State Highway Engineer

State Printing 60748

Form A-189—3M—4-40

(SAMPLE COPY)

This copy for:
- Contractor . . . ☐
- Division Engineer . ☐
- Resident Engineer . ☐
- Salem Office . . . ☒

OREGON STATE HIGHWAY COMMISSION

RECORD OF EXTRA WORK BILLS

To accompany:
Estimate No. 10
Contract No. 2686

Extra Work Order No.	Bill No. or Other Identification	Amount of Bill as Submitted by Contractor	Amount of Bill as Approved by Resident Engineer	Amount of Bill as Paid on This Month's Estimate	REMARKS (Note—Resident Engineer will make no entries on right half of this sheet.)
1	Payroll	$751.85	$751.85		
2	Payroll	109.44	109.44		

Bills submitted with this month's estimate.

Bills previously submitted but which have not been paid or otherwise disposed of.

Resident Engineer

Mail Address

Total amount of force account paid this estimate.

Total previously paid.

Total payments on force account work.

INSTRUCTIONS

Beginning with the first monthly estimate with which extra work bills are submitted, each and every monthly estimate shall be accompanied by a report on this form. Resident Engineer shall submit four copies to Salem Office, retaining one copy for his files. Salem Office, after supplying information as to bills passed for payment, will send one copy to Contractor, one to Division Engineer, and one to Resident Engineer, retaining the fourth copy.

Resident Engineer will indicate division between bills submitted with this month's estimate and bills previously submitted by drawing heavy horizontal line across left half of sheet.

STATE PRINTING DEPT.

Form A-189—3M—3-43

OREGON STATE HIGHWAY DEPARTMENT

Project Authorization and Record of Work Orders

Section
Highway
County
Kind of Work
Contractor

Contract No.
F. A. Project No.
Job Prefix
Date of Award
Division Engineer

CONSTRUCTION AUTHORIZATION

Contract amount . . . . . $

Additional anticipated items:

$

Subtotal . . . . . $

Contingencies (4½%) . . . . . .

Construction Engineering (8%) . . . . . .

Subtotal . . . . . $

Credit for maintenance rock . . . . . .

Total original construction authorization . . . . . $

Authorization increases, approved by Commission:

. . . . . $

Total present construction authorization . . . . . $

Survey authorization $

Right of way authorization $

RECORD OF WORK ORDERS

Date Order Received	Date of Order	Kind of Order	Number of Order	Net Amount	Remarks	PRESENT ESTIMATE OF COST Month	Amount

State Printing 56008

Form E-189—3M—4-41

(SAMPLE COPY)

Oregon State Highway Commission

ORDER TO RENDER SERVICE

(Or to Furnish Materials)

Party Requesting Service:

Oregon State Board of Control

Order No. 1

Date June 26 1945

By: Roy H. Mills

Secretary

(Official capacity)

Prefix and account number to which work is to be charged 20-1469

Description and Location of Work To Be Performed or Materials To Be Furnished:

Make survey, prepare maps, plans and specifications of the University of Oregon Athletic Field.

Estimate of Quantities and Cost:

Lump sum estimate $500.00

Basis of Payment:
- ☐ Monthly payments
- ☒ Single payment on completion of work
- ☐ Other basis as follows:

Amount of advance deposit (if any) $

Deposit received by Secretary on

Authority from Requisitionist:
- ☐ Agreement dated
- ☐ Letter to . . . . . date
- ☒ Oral request to McCullough date June 15, 1945

Department Authority:
- ☐ Order of Highway Commission
- ☒ Order of State Highway Engineer
- ☐ Head of department issuing order

Field information submitted by B. A. Martin in ~~[illegible]~~ Phone call 6/20/45

Expected date of completion of work or delivery of materials July 15 1945

Superintendent or engineer responsible for performance of work and submission of information for billing B. A. Martin

Record of billing requests:

Number		
Date		
Amount		

Instructions: Department head or staff engineer approving order will send original copy to Office Engineer and will retain duplicate copy. He will also send copies to interested division engineer, resident engineer and/or maintenance superintendent.

Order prepared by Construction Department

Signed (s) Edwin A. Pease

Construction Office Engineer

STATE PRINTING DEPT.

Form A-191—3M—4-41

OREGON STATE HIGHWAY COMMISSION

REQUEST FOR OUTSIDE BILLING

(Or Advice of Cash Transaction)

Address invoice to:

S. Simms

Sweethome, Oregon

Attention of

Request No. (assigned by staff engineer or head of department) CD-3

Date 12-21-44

Payer's Order No. (if any)

Department Order No. (if any) (Number of "Order to Render Service")

Description and Authority: (Describe the service rendered, stating kind of service, location, etc. Also refer to agreements, letters and orders by which payer authorized the service.)

Sale of State Highway Spiral Manual to outside party

Itemized Statement:

Quantity	Unit	Description	Unit Price	Amount
1	only	Oregon State Highway Department Spiral Manual	$1.41	$1.41

Has payer made payment for this service? Yes

If so, what is amount of payment? $1.41

Has payer made a deposit with the department to guarantee payment? Yes

If so, what is amount of deposit? $1.41

Is this a partial or final request for billing? Final

Have there been any previous requests for billing in connection with this same service? No

If so, give total of all previous requests . . . . . $

Also give number of last previous request

Credit distribution:

5015-900

Submitted by:

Construction Department

Approved:

Division Engineer

Approved:

(s) Edwin A. Pease

Department Head or Staff Engineer

Instructions: The original and duplicate copies shall be forwarded through the division engineer to the staff engineer or department head. Staff engineer or department head will forward original copy to the accounting division through the office engineer. Additional copies shall be prepared for and retained by the division office and other field offices concerned. If the request is to be accompanied by a payment, an additional copy shall be submitted for the use of the accounting division.

STATE PRINTING DEPT.

SECTION 15. MATERIALS AND TESTS

Article

1. Department of Tests.
2. Laboratory Responsible for Mixes.
3. All Materials of Construction to be Tested.
4. Sample Data Sheet.
5. Check Aggregate in Field for Proper Grading.
6. Send Samples of Material in From Along Proposed Routes.
7. Contractor Not to Remove State Materials.
8. Certify Materials Removed on Royalty Basis.
9. Test Pits and Tunnels.
10. Submit Report on Material Sources on Proposed Projects.
11. Prohibition on Use of Certain Materials From Outside of Oregon.

MATERIALS AND TESTS

Article 1—Testing Laboratory

The State Highway Commission maintains a fully equipped testing laboratory under the direction of the Engineer of Materials. Headquarters for this Department are in Salem.

Article 2—Laboratory Responsible for Mixes

It is the responsibility of the laboratory to design and control all concrete and oil or asphalt mixes on construction projects.

Article 3—All Materials of Construction to be Tested

No material will be used in highway or bridge construction without a written or verbal recommendation from the testing laboratory. When material must be used before testing is completed, special instructions will be given regarding the same. Eliminate all guess work regarding road materials and depend on recognized and standardized tests for your information and guidance. Follow these instructions carefully, especially regarding sampling of material, for the test is of little value—in fact sometimes misleading—unless the sample is taken intelligently and systematically.

All construction materials obtained on purchase order must be tested and approved by our laboratory before payment of the invoices can be made. It is necessary, therefore, that the Accounting Division withhold payment in each instance until a full report is received from the laboratory.

Because of the above facts and because of the necessity for making payments to vendors as promptly as possible it is necessary that samples be promptly submitted to the laboratory or that an inspection (in those cases where an inspection is necessary) is made promptly.

Sampling of materials is fully covered in Technical Report No. 43-2 "Manual of Standard Practice for Sampling Construction Materials".

Article 4—Sample Data Sheets

The standard Form E-71 must be filled out completely in triplicate. One copy should be forwarded through the mail to the Engineer of Materials immediately, the duplicate to the Division Engineer and retain the triplicate for the Resident Engineer. In case the Engineer has no form sheets, he should give all the information on plain stationery and mail to the Engineer of Materials. However, he should requisition the Materials Department for the form.

Care should be taken in filling out the Sample Data Sheet, Form E-71, giving all the information relative to the sample of material submitted which might be of value in considering the material for use.

The name of the project should always be given. This should be the name of the contract project, the bridge name and number, or the section name for maintenance work. The highway name and number, county, and the prefix should be given whenever a prefix has been assigned. Use only the prefix for the project upon which the material is proposed for use. This prefix is used as the basis for distribution of costs, the index for project files, and for checking tests against materials used on each project. The name of the contractor should be given wherever work is under contract. If the project is to be contracted but not yet awarded, the expression of "not yet let" or "to be contracted" should be used. On all state force account jobs, the term "State Forces" should be used. Address of the submitter of the information should be his mail address, and this will be used in mailing report on the test. If the sampler of the material is other than the submitter, his name and title should be given. If the sampler of the material is other than a state representative this information should be clearly marked.

Please classify the material as to general type of material, stating definitely how the material is to be used. Under "Purpose of Test" special tests should be named if they are desired. Specifications under which the material is to be used should be noted. In giving the source of the sample do *not* give station numbers

but give accurate and definite information by mile numbers, or the distance and direction from a fixed landmark. If the sample is not taken at the original source, give both sources. For example, crushed rock might be from maintenance stockpile at mile 82, Pacific Highway, original source from the Shedd quarry. If the material is a manufactured product, such as expansion joints, cement, oil, etc., do not fail to give the brand or manufacturer's name, together with the actual source of the sample taken. Any information regarding previous tests will assist the laboratory in checking results. The quantity of material represented has reference to the quantity of the material and not to the size of the sample. For pavement samples, all the blanks should be filled, together with whatever other additional information is obtainable.

When samples of bituminous mixtures are submitted, Form E-76 may be used. This form is especially adapted to give the information necessary on this type of sample and should be used by all state paving plant foremen and bituminous inspectors assigned by the Engineer of Materials in submitting samples of bituminous mixtures.

Article 5—Check Aggregate in the Field for Proper Grading

It is as important that aggregates manufactured under contract or purchased from commercial plants, especially aggregates to be used in oiling, bituminous macadams and pavements, meet our gradation standards as it is for them to meet the other requirements.

Each Resident Engineer having rock production projects shall provide himself with a set of standard testing screens and scales and daily screen tests shall be made. If the materials do not meet the requirements, as set forth in the contract specifications, the materials shall be rejected, the contractor or his representative immediately notified and the plant adjusted until they do meet the requirements.

The Division Engineer shall make frequent inspections to see that the aggregates meet standard requirements in every respect.

As the department has only a limited number of sets of screens and scales, Resident Engineers are to turn in their screens and scales to the Equipment Engineer as soon as they are no longer needed, in order that they may be used elsewhere.

The Resident Engineer will be held responsible for obtaining aggregates that meet the department's standards in every respect.

Article 6—Send Samples of Material in From Along Proposed Routes

Samples of stone or gravel along the route of a proposed highway which appear suitable for construction purposes should be sent in for tests.

Article 7—Contractor Not to Remove State Materials

The contractor shall not be given permission to remain in the State quarries or to operate them for private purposes.

If contractors are to produce material for counties or cities, special arrangements shall be made by the Construction Engineer at Salem.

Article 8—Certify Materials Removed on Royalty Basis

On construction projects where materials are acquired from private ownership on a royalty basis, it is important that a statement of the total quantities taken be prepared, and certified to, by the Engineer in charge of the work at the time the project is completed. This statement should then be approved by the Division Engineer and forwarded to the Construction Engineer without delay, in order that proper settlement may be made with the owner of the property.

Article 9—Test Pits and Tunnels

(See Section 12, titled "Soils".)

Article 10—Submit Report on Material Sources on Proposed Projects

Form 525 "Statement of Material Sources and Stockpile Sites", shall be used by the Resident Engineer in reporting material sources and stockpile sites. This form properly filled out in the field and submitted with location data will supply information which may otherwise be overlooked by the Division Engineer. Three copies of this form are required. (See 17-3.)

Article 11—Prohibition on Use of Certain Materials From Outside of Oregon

Under Section 3 of Chapter 24, Oregon Laws of 1943, cement, sand, crushed rock, gravel and plaster, used on State construction work, must be of Oregon production or Oregon manufacture "in all cases where the bid prices of such materials are no greater than those of similar materials produced or manufactured outside of Oregon".

As responsibility for compliance with the section above referred to is placed on the Commission or Board, under whose supervision the work is performed, it will hereafter be the duty of the Resident Engineers and Division Engineers to see that no materials of the kinds mentioned, which have their source outside of Oregon, are used by contractors on State projects, unless, and until the contractor submits acceptable evidence that equally suitable materials of Oregon production or manufacture are not obtainable at the same or a lesser cost, and unless, and until, the use of the materials from outside of Oregon is specifically approved, in writing, by the State Highway Engineer or the Assistant State Highway Engineer.

Authority for action as above indicated will be included in all contracts for the class of projects to which the requirement applies.

The requirement herein stated applies only on State projects. It does not apply on federal aid projects or other projects financed in whole or in part with federal moneys.

Form E-71—10M Sets—7-45

Laboratory number

(Do not use this space)

OREGON STATE HIGHWAY COMMISSION
MATERIALS DEPARTMENT

Data Sheet

SAMPLE DATA SHEET

№ 77458

Project Roots Creek - Siletz Section (Give name of section or bridge upon which material is to be used or from which sample is submitted) Prefix No. 121-1005 (This is important)

Highway Siletz Secondary County Lincoln

Contractor E. C. Hall Co. (Give name of contractor if work is under contract) Contract No. 2740 F. A. Project No. DA-RM 93(1)

Submitted by S. F. Walters Title Res. Engr. Address Newport

Identification of sample: 77458 (Preferably use sample number given at top of this sheet) Sheet No. 17 (Numbers for each job to begin with one)

Shipped Aug. 27, 1945 (Date) By Auto Freight (Express, parcel post, freight) Approximate quantity 30 lbs.

Sampled by S. F. Walters Title Res. Engr. Address Newport

If sample submitted is of material to be used in construction or maintenance fill in following:

Kind of material 3"-0" Crushed Rock To be used in Surfacing (Bridge, culvert, pavement, macadam, surfacing) construction

What particular part of work Base Course (Class A, B or C concrete, piers, superstructure, top course, base)

Purpose of test Screen Analysis, Plasticity Index and Liquid Limit

Source of sample C.D. Johnson Quarry, 1.5 mi. N. of MP 17.5 (Give as accurate a location as possible)

Sampled at MP 17.0

Has material from same source been tested previously Yes. If so, give sample numbers 78397, Lab. No. 180993

Quantity of material represented by sample 2,000 cu. yds.

Average length of haul to job, by rail ; water ; overland

If sample is a paving sample taken from pavement in place, fill in following:

Kind of pavement Course

Location by station numbers

Date laid Date sampled

Remarks.

INSTRUCTIONS

This form is to be filled out and submitted whenever a sample of material or pavement is sent in for laboratory test or analysis. White sheet to be mailed directly to Engineer of Materials, Salem, Oregon, and blue to Division Engineer, except in the case of material for bridge construction when the blue copy is sent to Bridge Engineer, Salem, Oregon. Yellow sheet to be retained by inspector or field engineer. If the submitter of the sample is not the engineer in charge, the engineer should be named in the remarks. Note should be made if the material is to pass special specifications. The sample should be sent directly to Engineer of Materials, Testing Laboratory, Salem, Oregon, and should be marked with the sample number appearing at the top of this page.

Respectfully submitted,

(S.) S. F. Walters

STATE PRINTING DEPT.

Form E-70—25M Sets—7-45

Laboratory Number

(Do not use this space)

OREGON STATE HIGHWAY COMMISSION
MATERIALS DEPARTMENT

Data Sheet

SAMPLE DATA SHEET

Bituminous Mixture

№ 68026

Project Albany - Crabtree Corner Prefix No. 22-114 (This is important)

Highway Santiam County Linn

Contractor or Foreman Warren Northwest, Inc. Contract No. 2726 Crew No. or F. A. No.

Submitted by Paul G. Deuber Date July 19, 1945

Identification of sample: 68026 (Preferably use sample number at top of this sheet) Sheet No. 9 (Number for each job to begin with one)

Shipped July 19, 1945 (Date) By Parcel Post (Express, parcel post, freight) Approximate quantity 7 lbs.

Sampled by Paul G. Deuber Title Inspector Address Salem

If sample submitted is a bituminous mixture fill in the following:

Type Asphaltic concrete (Asphaltic concrete, bituminous or oil macadam) Sample No. 9

Kind of Mixture Class "B" (Base, top, fine mix)

Brand of Asphaltic Cement Western Asphalt & Refining Co. Grade 61-70 (If asphalt give penetration)

Location by Mile Station No. 128, North side Date Laid July 19, 1945

Average Thickness 3 inches

Weather Cloudy

Remarks:

(Give condition of road being patched or paved and any other information that will be of value in checking work, such as mix used)

If sample is a cut sample from pavement in place, fill in the following:

Kind of Pavement Course

Location

Date Laid Date Sampled

Remarks:

INSTRUCTIONS

This form is to be filled out and submitted whenever a sample of bituminous mixture or pavement is sent in for laboratory test or analysis. White sheet to be mailed directly to Engineer of Materials, Salem, Oregon, and blue to Maintenance Engineer or Division Engineer as the case may be. The yellow sheet to be retained by plant foreman, resident engineer or inspector. If the submitter is not the resident engineer, the resident engineer should be named in the remarks. Note should be made if the material is to pass special specifications. The sample should be sent directly to Engineer of Materials, Testing Laboratory, Salem, Oregon, and should be marked with the sample field number appearing at the top of this page.

Respectfully submitted,

(S.) Paul G. Deuber

Mail Address: Salem

STATE PRINTING DEPT.

Form No. [illegible]

OREGON STATE HIGHWAY DEPARTMENT

Statement of Material Sources and Stock Pile Sites

(This statement to be prepared by Division Engineer and submitted in triplicate with Special Provisions to the Salem Office.)

Date June 4, 19 45 County Malheur

Section Blue Hill Highway John Day

Length 9.25 miles. Limits Sta. 16+54 to Sta. 505+88

Type of improvement Maintenance Materials

Surveyed by John Doe Year 1945

SPECIFIED STOCK PILE SITES AND SOURCES OF MATERIALS

Site No.	Used	New	Kind	Dist. Lt.	Dist. Rt.	Sta.	M. P.	Owner	Hwy. Map File No.	Lab. No.
1		x	S.P.		400'		73.28	L.M. Simpson		
2	x		S.P.	50'			75.16	State of Oregon		
3		x	Q		150'		76.90	O. L. Olsen		
4	x		S.P.		80'		79.20	State of Oregon		

Q.=Quarry or Quarry Site; G. P.=Gravel Pit; G. B.=Gravel Bar; B. P.=Borrow Pit; T. D.=Talus Deposit; S. P.=Stock Pile Site; Adj.=Adjacent to.

ADDITIONAL DATA:

a. Descriptions and maps required for above submitted May 14, 19 45

b. Hauling roads required? none Data submitted 19

c. Are all required sites included? Yes Balance when?

Signed
Division Engineer

NOTE: Additional data and remarks should be made on the back of this report.

STATE PRINTING DEPT.

SECTION 16. EQUIPMENT AND PROPERTY CONTROL

Article

1. Property Control Section of Maintenance Department to be Notified Before Engineer Leaves Department.
2. Stamped Approvals Not Accepted.
3. Requests for Mechanized Equipment.
4. Requisitions for Engineering Equipment and Supplies.
5. Transfer of Equipment on Rental Basis.
6. Transfer of Supplies and Equipment not on Rental Basis.
7. Equipment and Supplies not to be Transferred Without Approval.
8. Effective Date of Rental Charges.
9. Standard Stationery and Office Supplies.
10. Property Lost, Stolen, for Sale or Exchange.
11. Careless or Negligent Care of Equipment is Cause for Dismissal.
12. State Supplies and Equipment are not for Private Use.
13. Property Not to be Transferred Outside of Department.
14. Operatiton of Equipment.
15. Care and Time of Replacement of Tires.
16. Field Purchase of Tires.
17. Classes of Equipment Rental.
18. Charges for Upkeep, Repair and Operation.
19. Rental Rates.
20. Planometer Rental Rates.
21. Gas and Oil Purchases at State-owned Pumps.
22. Gas and Oil Purchases at Public Stations.
23. Storage of State Cars.
24. Do Not Park Cars on the Street for Long Periods.
25. Mileage for Use of Private Cars.
26. Field Emergency Purchases.
27. Memorandum Receipt Form A-173.
28. Purchase Order and Receiving Record.
29. Equipment Department Invoice.
30. Bills Which Exceed $50.00 to be Accompanied by Form A-22.
31. Record of Tires to be Kept.
32. Field Purchase of Car Batteries.
33. Speedometers.
34. Field Repairs to Equipment.
35. Equipment Rental Report.
36. Transfer of Charges and Correction of Erroneous Cost Distribution.

EQUIPMENT AND PROPERTY CONTROL

Article 1—The Property Control Section of the Maintenance Department to be Notified Before Engineer Leaves Department

Advance notice must be given to the State Property Control Section whenever an engineer or other person charged with or held ressponsible for state-owned equipment or other property is to leave the employment of the Highway Department.

The giving of this advance notice is a joint responsibility of the employee concerned and his immediate superior. These men should check with each other to make sure that the required notification is given.

This notice should be given sufficiently in advance of the date of discontinuance to make possible the retention of the employee's earnings in an amount sufficient to insure a proper accounting for the property involved.

Article 2—Stamped Approvals Not Accepted

Rubber stamp approvals will not be accepted.

Article 3—Requests for Mechanized Equipment

Requests for mechanized equipment shall be made, through regular channels, to the Construction Engineer.

Article 4—Requisitions

(a) *Purchase Through Storeroom*—Requests for engineering equipment, materials and supplies usually carried in our storerooms shall be made on Form A-33, "Storeroom Requisition". (For invoices on this type of purchase see 16-29.)

Instructions as to Routing Copies—Form A-33.

Requisition originated by Resident Engineer:

For Salem Storeroom—Original, triplicate and quintuplicate will be forwarded to the Division Engineer. Division Engineer will approve the first two copies, retain the triplicate and forward the original and quintuplicate through the Maintenance Engineer's office to the Salem storeroom. The Resident Engineer will retain the quadruplicate and destroy the duplicate.

For Branch Storeroom—Original, duplicate, triplicate, and quintuplicate, will be forwarded to the Division Engineer. Division Engineer will approve first three copies, retain the triplicate, and forward the original, duplicate and quintuplicate to the nearest storeroom. The quadruplicate will be retained as stated above.

Requisition originated in office of Division Engineer:

For Salem Storeroom—Original and quintuplicate will be forwarded to the Maintenance Engineer who will approve the original and forward both copies to the storeroom. The Division Engineer will retain the quad-

ruplicate and destroy the triplicate, and duplicate.

For Branch Storeroom—Original, duplicate, and quintuplicate will be forwarded to the branch storeroom. Division Engineer will retain the quadruplicate and destroy the triplicate.

(b) *Items to be Purchased From Vendors*—Request for supplies, etc., which are not usually carried in our stock room and for items which can not properly be classified as "emergency", shall be made on Form No. A-34 "Purchase Requisition". (Important: See Section 16, Article 26 for Emergency Field Purchases.) Form A-34 will be routed as follows:

Requisition Originated by Resident Engineer—Original, duplicate and triplicate will be forwarded to Division Engineer, who will approve all copies, retain the triplicate and forward the original and duplicate through the Maintenance Engineer's office to the Accounting Division. The quadruplicate will be retained by the Resident Engineer.

Requisition Originated in Office of Division Engineer—The original and duplicate will be forwarded to the Maintenance Engineer for approval. The duplicate will be retained by the Maintenance Engineer and the approved original forwarded to the Accounting Division. The triplicate will be retained by the Division Engineer and the quadruplicate will be destroyed.

Article 5—Transfer of Equipment on Rental Basis

When property on rental is being transferred, Form A-29 "Equipment Transfer Report" shall be made out by the person from whom the property is being transferred. The rental rate and the effective date of rental charges must be shown in the space provided. See 16-20 for planometer transfers.

When rental equipment is transferred on form A-29 check to see that all tools and accessories as listed are transferred, or account for the items short by a transfer of property or request for relief of property.

Article 6—Transfer of Supplies and Equipment Not on Rental Basis

When property not on rental is transferred, Form A-49 "Transfer of Property" must be prepared. This form is to be used only in transferring property from a Resident Engineer or person in responsible charge to another Resident Engineer or person in responsible charge. Follow instructions on the face of the form.

Article 7—Equipment and Supplies Not to be Transferred Without Approval

Resident Engineers are not permitted to transfer equipment or supplies between each other without approval of the Division Engineer or the Construction Engineer.

Article 8—Effective Date of Rental Charges

Rentals, under either or both schedules, will be computed from the day equipment leaves an equipment depot until it is returned, both days included. Or in the case of transferring equipment from one engineer to another, the engineer receiving the equipment shall be charged rental beginning with the date of shipment.

Article 9—Standard Stationery and Office Supplies

The storeroom maintains a large stock of standard office supplies and it is requested that all such supplies be requisitioned from this source.

Article 10—Property Lost, Stolen, for Sale or Exchange

Form A-182 "Request for Relief of Property Lost, Stolen, for Sale or Exchange" shall be used for all property which is lost or stolen on which persons in responsible charge are asking relief. It must bear the signature of all members of the Board of Survey before the person in responsible charge shall be relieved of responsibility. Property stolen or lost must be promptly covered by Form A-182, listing the lost items separately from those stolen giving both date and circumstnances.

In cases where bulky property is in such a condition that it is impossible to send it in or it is beyond any further use, such as rusted out stove pipe, worn out and torn mattresses, etc., write in for special instructions for disposal, giving full particulars as to age, condition, circumstances, quantity, cost and method of transportation to send in, etc.

Request for Relief of Property, Form A-182, is to be used only to cover property that has been lost, stolen or accidentally destroyed (as by fire). Form A-49 is to be used when property is being transferred or turned in.

When making request for relief be sure to give full particulars under "Remarks". To say only that the property was lost or stolen on such and such a date intimates carelessness and will invariably occasion the recommendation against relief. *It is, therefore, necessary to give*

complete details as to how, why, when and where the property disappeared, when first noticed, what action or steps were taken to find or recover, etc. Only by your remarks and explanations can the Survey Board intelligently act upon your request for relief.

Article 11—Careless or Negligent Care of Equipment is Cause for Dismissal

Any person found to be careless or negligent in the care or handling of State equipment will be discharged immediately.

It has been noted that tools have been carried loose in equipment. This practice will not be allowed and therefore a special box or receptacle shall be provided and tools kept therein at all times.

Article 12—State Supplies and Equipment are not for Private Use

State supplies or equipment shall not be used for any other purpose than that for which they are intended, special reference being made to gas and oil purchases which shall be used in State vehicles. Failure to comply explicitly with these orders will be cause for instant dismissal.

Article 13—Property Not to be Transferred Outside of Department

State-owned property of any kind shall not be transferred to any party or organization which is not a part of the Oregon State Highway Department except upon specific approval of the State Highway Engineer.

Article 14—Operation of Equipment

The Board of Control receives a monthly report of all automobile accidents occurring during the month, and whenever a driver of State equipment is involved in an accident where the facts indicate that he was to blame for the accident, warning should be issued to him.

The insurance company carrying our insurance has indicated that they will refuse to continue to insure a driver who is involved in more than two accidents for which he is entirely to blame.

Article 15—Care and Time of Replacement of Tires

Tires will not be considered as worn out and will not be replaced unless the carcass of the tire shows signs of distress. Tires must be sent to one of the State Shops for recapping *before the carcass shows signs of distress and before the fabric shows.*

Tires on equipment operated by the State Highway Department are to receive the same consideration as tires used on vehicles in private use. It is not intended that State Highway Department employees' lives be endangered for the sake of economy wherein there is danger of a tire blowing out, but it will be necessary that operators of cars take into consideration the condition of the tires and drive accordingly.

Article 16—Field Purchase of Tires

It is sometimes necessary under extreme conditions for field employees to purchase tires or tubes in the field. Under normal conditions the state contract will be placed with such tire and rubber company as can best supply State needs, both wholesale and retail, and at that time the persons securing tires or tubes for State equipment from other than the contracting company will be held responsible for the difference in price which the State would pay the company under contract.

Refer to Section 16, Article 26, for instructions to be followed when making an emergency field purchase.

Article 17—Classes of Equipment Rental

Equipment rentals are of three classes.

Schedule "A" (Monthly Basis) for equipment regularly assigned to engineering, construction and/or maintenance work in charge of an engineer or a sectionman.

Temporary Field Storage does not apply to equipment on a monthly rental basis, and although the equipment is worked only a few days a month, it is *not* considered in storage the non-use days and must be carried upon the monthly equipment inventory for the full month or until transferred.

Dead Storage can be arranged for special seasonal equipment not required at the Equipment Shops for overhaul and certain to be reassigned to the same location. This type of storage is used to save the expense of needless moving of equipment to Equipment Shop storage and back again. In dead storage of mowers, asphalt kettles, snow plows, sanders, etc., there will be certain procedure and instructions which the Shop Superintendents will wish to specify; therefore, this type of dead storage should be arranged for by taking the matter up with the Equipment Shop Superintendents.

Schedule "B" (Shift Basis) for equipment assigned to extra gangs, special crews or to

emergency crews on temporary assignment to regular maintenance and/or construction work. Equipment on shift basis rental may be used a minimum of 33 1/3% or ten shifts per month and is considered in *temporary field storage* the part of the month it is not in use, and for the non-use days it is *not* shown on the monthly inventory.

Schedule "C" Fully operated Rental Rate per hour charged to Governmental Agencies, State Departments, Counties, Cities, and other outside parties.

Shifts shall be computed as follows:

1 —Shift shall be any time up to and including 12 hours in any one day.

1½—Shifts shall be any time over 12 hours, and not more than 18 hours in any one day.

2 —Shifts shall be any time over 18 hours, in any one day.

Rentals, *under all schedules,* will be computed from the day equipment *leaves* an Equipment Depot until it is *returned.*

Article 18—Charges for Upkeep, Repair and Operation

The rates set up in both schedules are designed to cover all charges for overhauling the equipment; also, all charges for field repairs and all replacement parts except the replacement and repair of grader blades, snow plow blades, scarifier teeth, broom cores, pressure kerosene burners, section hose, cable, mower guards or anything pertaining to the cutting apparatus of mowing machines. Charges for gas, oil, grease, anti-freeze solutions and storage are not covered by the rental, but charged to the job. (The rental, however, absorbs all labor charges for greasing, oiling and washing.) All tools to replace tools originally checked out with equipment, small tools and supplies used by field mechanics in repairing equipment, and all repairs, replacement and towing charges due to wrecks in cases where the driver is at fault and not due to mechanical condition of the equipment, are *not* covered by rental but charged to the job and the cost distribution should be given on all Emergency Purchase Requisitions and/or Storeroom Requisitions. Charges for items covered by the rental should not be distributed direct to the job on which the equipment is being used but the equipment numbers should be shown on all Emergency Purchase Requisitions and/or Storeroom Requisitions, covering such charges. Labor performed by members of State crews in making minor emergency repairs on equipment must be charged direct to the job.

Article 19—Rental Rates

State equipment used on projects are charged for at definite monthly or hourly rates, which rates are set forth in schedules published from time to time and which are available on request.

The rates set up in these schedules are based on a definite depreciation on each item and/or class of equipment and are made from experience records. The depreciated rates are shown in the second column of the schedule. After the original cost of any piece of equipment (plus betterments) have been amortized, the rental rate will be reduced to the depreciated rate. You will be notified when this depreciated rate becomes effective on any piece of equipment.

Article 20—Planometer Rental Basis

Planometers will be charged to the Resident Engineers in a manner comparable to the direct purchase. In transferring these machines from one engineer to another the cost of the machine should be decreased at the rate of $2.00 per month or fraction thereof if it has been used on the job. For periods when these machines are not in use no charges should be absorbed, as in the winter months.

Form A-29 Equipment Transfer Report shall be used in transferring planometers. (This instrument is not be to be confused with the planimeter, used for obtaining areas of plane figures.)

Article 21—Gas and Oil Purchases at State Pumps

(a) *Gas, Oil and Grease From State Shop Pumps*—The instructions contained herein apply only to service obtained from pumps located at state shops.

The duplicate of gas, oil, and grease tickets, Form A-81, issued for service obtained at shop gas pumps, are to be retained by the driver and turned in to his headquarters office, as follows:

Employee of	*Duplicate Tickets to be Turned in to*
Resident Engineer	Resident Engineer's office
Locating Engineer	Locating Engineer's office

In case the driver is not with the equipment when serviced, the duplicate ticket will be for-

warded to the respective headquarters office, by the shop office. The headquarters office is to indicate the cost distribution on every gas ticket for service obtained at shop gas pumps, and forward such tickets to the Accounting Division as of the close of business on the fifteenth and last day of each month. The tickets should be accompanied by a note indicating "Service from Shop Pump", in order to identify the group of tickets when received by the Accounting Division.

The Accounting Division will prepare forms A-30 and A-32. Form A-31 is not required to be submitted for this class of tickets.

(b) *Gas, Oil and Grease From Maintenance Pumps*—Pumps located at division office, district maintenance offices and section headquarters will be herein referred to as "maintenance pumps".

Whenever gasoline, oil and grease is obtained from a "Maintenance Pump", a ticket (Form A-15) must be filled out showing all the information called for on the form, also the proper cost distribution. The cost distribution is to be placed in the space at the bottom of the ticket. The words "Cost distribution of items not used on equipment" refer to maintenance equipment. The ticket must be signed by the driver and if the attendant is not present the driver must also sign the ticket as pump attendant. The triplicate copy of the ticket is to be deposited by the driver in the locked box provided for that purpose. The original copy of the ticket is to be left with the book for the pump attendant who will forward it to the District Maintenance Superintendent.

When gasoline is obtained from a maintenance pump by the driver of equipment in transit, when the cost distribution is not known, the procedure outlined above shall be followed with this exception: The driver need not show cost distribution on the ticket but shall retain the triplicate copy and turn it in to the party to whom the equipment is consigned, who will show cost distribution and forward the ticket to the Accounting Division. In such a case the pump atendant is to write, in the cost distribution space on the original ticket, the words "Triplicate to Driver".

Article 22—Gasoline and Oil Purchases at Public Stations

Each year the Oregon State Department of Finance and Administration enters into a contract with one of the oil companies for the purchase of petroleum products to be used in state equipment. The terms of the contract cover both bulk and service station deliveries.

Employees of the State Highway Department are required to obtain gasoline, oil, etc., from state-owned pumps whenever possible. In an emergency, credit card purchases may be made from service stations dispensing products of the company under contract. *If purchases are made of products other than those of the contracting company, a letter of explanation giving the reason for such purchase, will be required.*

Field crews will be notified, each year, of the company holding a contract to furnish gas, oil and grease to state equipment.

Instructions relative to the handling of service station charge slips follow:

When service is obtained by the use of a credit card, the employee who signs for the service shall, at the time he signs the service station charge slip, write the Highway Department equipment number and the cost distribution, so that all copies of the charge slip will indicate such information. This information is of the utmost importance in the final approval of the charges for payment, which will be made in the Accounting Division.

A copy of the service station charge slip must be obtained from the service station attendant immediately after signing the slip. This copy is to be forwarded by the employee to his immediate superior for approval, and immediately thereafter the slip is to be forwarded to the Accounting Division.

Offices keeping field cost records, will be expected to take their costs from the service station charge slip, on its way to the Accounting Division.

The price shown on a service station charge slip will not agree with the price covered by contract. A schedule of contract prices will be furnished with the letter of notification of the company holding the contract, so that the charges from service station slips may be posted to the field cost records at correct prices.

Copies of service station charge slips will not be returned to the field after having been received by the Accounting Division. It is imperative therefore, that each charge slip be complete as to equipment number, cost distribution, and signatures.

Article 23—Storage for State Cars

State-owned cars when not in use shall be stored in highway equipment shops or equipment sheds where same are available. If state-owned or rented equipment sheds are not available, the cars should be stored in commercial garages at a reasonable storage rate. Under no circumstances shall any employee use a state-owned car for transportation between his home and the office save and except when he returns so late at night that it is not possible for him to place the equipment in storage buildings. Exception is made in the case of requiring storage in state shops at Klamath Falls, because the state shops are three miles from the center of the city. Permission is given in this case to rent storage in commercial garages, provided the rent is reasonable.

Article 24—Do Not Park Cars on the Street for Long Periods

Do not keep a state car parked on the street other than for short periods of time. Cars deteriorate rapidly when exposed to the weather. Furthermore, when the vehicle is stored in the state shop it is available for use for other employees in case of emergency. If you are to be in the office all day or the major portion of the day, store the car either in the state equipment buildings or in a commercial garage as the case may be and don't take the equipment out until you are ready to go out on official state business requiring an automobile. It will not be necessary for employees who do not have keys to shops or sheds to store in state buildings when they arrive after closing hours.

Article 25—Mileage for Use of Private Cars

Mileage will be paid for the use of private automobiles only under specific conditions, viz:

(a) In the case of bridge tenders who have two or more bridges to look after and who have to make occasional trips which would not warrant the keeping of state equipment and then only when specifically approved by the State Highway Engineer.

(b) In the case of county employees temporarily hired by the State and under arrangements specifically approved by the State Highway Engineer.

(c) Specific instances wherein state equipment is not available, for periods of short duration only, and then only when specifically approved by the State Highway Engineer.

Article 26—Field Emergency Purchases (Form No. ADM PD-7)

Field emergency purchases are defined as purchases which, because of their nature or their urgency, cannot be made through the Accounting Division at Salem, or avoided by ordering from a department storeroom. They shall be limited to purchases of items, the need for which arises on short notice, and the delivery of which must be had immediately in order to avoid expensive delays, or to prevent damage. They may, however, include items such as office rent, public utility services and storage charges which, by reason of their nature, cannot be handled through the Requisition Department.

Field emergency purchases shall be limited to purchases made from dealers *located in the immediate vicinity of the work.* If materials, supplies or parts are to be obtained from wholesalers or manufacturers at points not in the immediate vicinity of the work, the purchases are to be requisitioned on purchase requisition Form A-34 and forwarded through the regular channels of approval.

Urgent repairs to equipment at the authorized shop (Fords to Ford garages, Chevrolets to Chevrolet garages, etc.) may be made, provided cost does not exceed $1.00 per mile distance to the nearest Highway Department shop. Authorization must be obtained from nearest Shop Superintendent on all repairs over $1.00 per mile of distance and all repairs over $50.00 regardless of distance from Highway shops.

In making emergency purchases, competitive quotations should be obtained, if possible, before the order is placed.

It shall be understood that in every instance, where it is possible, requirements shall be anticipated sufficiently in advance to enable ordering through the regular channels. Emergency requisitions for purchases of parts to be used on equipment, or for repairs to equipment, shall not be issued for an amount in excess of $5.00, without the approval of the nearest shop superintendent, or master mechanic, except when the nearest shop superintendent, or master mechanic, is at a greater distance than 25 miles, in which case the limit without approval shall be $15.00. Estimates of the cost of parts for equipment and of repairs to equipment, shall be obtained from the vendor, and, in the event the estimate exceeds $5.00 or $15.00 subject to the foregoing provisions, the engineer or fore-

man in need of such parts or repairs shall communicate with the nearest shop superintendent, or master mechanic, before issuing the emergency requisition. In the event of actual emergency, wherein the materials and/or repairs will exceed $50.00, verbal approval shall first be obtained from the proper Staff Engineer before the emergency requisition may be issued. The duplicate of such emergency requisition, after having been approved by the Division Engineer, shall be forwarded to such Staff Engineer for approval.

Emergency requisitions are not to be issued to cover damage to property resulting from the activities of the Highway Department, Report of such damage is to be carried on exactly as heretofore.

A requisition shall be issued for each emergency purchase, the requisition being prepared in each instance on Field Purchase Order Form No. ADM PD-7.

For all emergency purchases other than equipment repair work, the engineer or foreman shall prepare and sign Form ADM PD-7, in six copies at the time of purchase. Requisitions for equipment repair work may be made up and signed when the repair work is completed, and when the exact cost is known. In an exceptional case, when the garage owner does not have the repair part in stock, and receives it from some central depot before the invoice is received, the emergency requisition is to be sent in, showing the approximate cost plainly marked "Approximate".

Form, ADM PD-7, has been designed for use by all State Agencies so that it will not be necessary to complete all sections. The following instructions for the preparation of the Field Purchase Order have been keyed to the numbers shown on the reproduction of the form which is shown at the end of section.

1. Name and address of vendor (Black Cat Garage, Madras, Oregon, etc.)
2. Oregon State Highway Department, Madras, Oregon.
3. If it is the same as "2", enter the word "same", if not, give shipping instructions.
4. Date of order.
5. Desired delivery date. If it is a pickup, so indicate.
6. Leave Blank
7. Leave Blank.
8. Oregon State Highway Department, Salem, Oregon.
9. 4.
10. to 10g. Leave Blank.
11. State whether informal bid, telephone quotation, pickup, etc.
12. Net cash—2% 10 days—etc.
13. F. O. B. point.
14. Pickup or number of days allowable for shipment.
15. Total units of each item.
16. Itemize purchases.
17. Unit price.
18. Extended amount of order.
19. Cost distribution—equipment number.
20. Oregon State Highway Department. Signature of person making purchase.

20a. Approved by immediate superior, the same as our present form A-16.

21. Division Engineer, Parks Superintendent, Division Head, etc.

If a set of purchase orders should be spoiled for any reason, the duplicate (orange) copy shall be marked "void", and forwarded to the Accounting Division.

There are six copies to a set of form ADM PD-7, and the following routing and distribution must be adhered to in order to expedite the processing of claims.

Original completely filled in as described above and given to vendor at time of purchase. The only signature required on the original is the signature of the purchaser (20).

The third (yellow) copy is to be used as the receiving record and should be completed by the person receiving the merchandise. The receiving record copy should be detached before filling in the quantities received, etc., so that it will not print through on the balance of the copies.

After the receiving record copy is completed it should be forwarded together with the other four copies to the immediate supervisor, (D.M.S., Resident Engineer, Parks Supervisor, Sign Engineer, etc.) for approval (20a). The supervisor, after approving the purchase, shall retain the fifth (pink) copy. The remaining four copies should be forwarded through organizational channels for approval (21) by the Division Engineer, Parks Superintendent or Division Head, etc.

The office signing as the authorized agent (21) shall retain the last copy of the field purchase order and forward the remaining three approved copies (orange-yellow-blue) to the Accounting Division.

It is imperative that these three copies be forwarded to the Accounting Division promptly as they will be unable to process any claim until they have received the above mentioned three approved copies of the field purchase order.

Emergency requisitions for initiating service for public utility charges of light, gas, water, and telephone, for monthly storage charges on equipment, and for office rent, will be required. Emergency requisitions will not be required for each subsequent month of service, but the engineer responsible for the charges shall promptly notify the Accounting Division of the discontinuance of such service.

In the case of emergency repairs of tubes, and emergency purchases of repair parts, when the equipment on which the parts are to be used is in transit and the parts are needed in order to permit the equipment to be operated immediately, the person obtaining such tube repairs or repair parts may have the expense charged, and obtain a sales ticket in duplicate from the vendor. The sales ticket shall show the date of the transaction, the equipment, number, details of the items as to quantity, unit, description, unit prices and amounts, and the total charge. The sales ticket shall be approved by the engineer or foreman in charge of the crew, and shall be forwarded as follows:

For Purchases by Engineering Crews—Both copies of the sales ticket shall be forwarded to the division office where the Division Engineer shall approve and forward both copies to the Construction Engineer or Bridge Engineer. The Construction Engineer or Bridge Engineer will retain one copy of the sales ticket for his files and forward one copy to the Accounting Division at Salem.

It is suggested that the approvals be placed on the back of the sales ticket in order that the details on the face of the sales ticket will not be marked over.

Inasmuch as the approved duplicate of the field emergency purchase requisition is to be forwarded to the Accounting Division, and is to be used by the Accounting Division for comparison with the vendor's invoice, it will not be necessary to approve the invoices in the field, except as set forth in the paragraph below. A copy of the audited invoice will be forwarded by the Accounting Division to the field office keeping the field cost records.

Invoices for electric power, gas, water and telephone; invoices for monthly storage charges on equipment, and invoices for office rent will continue to be sent to the field for approval, as requisitions for those items are necessarily indefinite as to amount and expiration limit. Invoices sent to the field offices for approval will be marked by a slip attached by the Accounting Division, stating that the invoices are to be approved and returned.

Emergency requisitions will not be required to be issued by Staff Engineers, Division Engineers and other administrative employees when storing cars overnight, or when having car repair work performed, at garages where the Department maintains charge accounts. For each such charge, however, the engineer shall obtain a sales ticket and, after approving the ticket and showing the car number, shall forward it to the Accounting Division at Salem, to be used by the Accounting Division in auditing the statement received from the garage. If the engineer desires a copy of the sales ticket for his own files, he should request the garage to issue a duplicate copy for that purpose.

The Division Engineer will be expected to see that emergency purchasing is held to a minimum in his division.

Changes in cost distribution on field emergency purchase requisitions may be made prior to the time the receiving record (duplicate) copy is forwarded to the Accounting Division, otherwise the changes should be requested on Form A-87.

Article 27—Memorandum Receipt (Form A-173)

This form is used to fix the responsibility for property on all emergency purchases and on all shipments direct from the vendor. This form will be prepared by the Accounting Division on all commercial invoices covering purchases of this nature, and sent to the field for signature.

Article 28—Purchase Order and Receiving Record

The purchase order forms referred to hereinafter are the forms used by the State Purchasing Department in placing orders with commercial firms for goods requisitioned by the Highway Department. The forms are filled out in the office of the State Purchasing Department and are forwarded by that Department to the firm from which the purchase is to be made. Several copies of each purchase order come to the Highway Department, and it is the handling of these copies that is hereinafter described.

Purchase order Form (A-36) is so designed that the triplicate copy becomes a receiving record by which the person receiving the goods (materials, supplies, parts, etc.), shall record by actual count, measure, or weight, the items actually received.

The Accounting Division at Salem will approve all invoices of purchase orders, using as its authority the receiving record submitted from the field. The vendor's invoices will not be approved in the field, but an audited copy of the invoice will be sent to the field office in which the field cost records are kept.

The procedure requires that the cost distribution be shown on the purchase requisition Form A-34 (see Sec. 16-4) at the time it is prepared. The distribution so shown will be used by the Accounting Division in making distribution of the invoiced amount. In every instance in which it is possible, show the actual final cost distribution opposite each item on the requisition. On all requisitions for equipment parts, the cost of which is covered in the Euipment Department rental rate, distribution shall be by equipment number only, distribution by job prefix and account number not being required on requisitions of that kind.

Immediately upon receipt of the purchase order from the State Purchasing Department, the Accounting Division at Salem will forward the triplicate copy of the order to the person indicated on the purchase order as the consignee. The quadruplicate copy will be forwarded to the office in which the purchase requisition was prepared.

The triplicate copy of the purchase order, when sent to the consignee, will not show the quantities ordered, but will be complete as to all other information concerning the order. As a general rule, it is expected that the triplicate purchase order will reach the consignee prior to the shipment of the goods.

When the consignee receives the shipment, he shall count, measure, or weigh the items received, and write the quantities on the triplicate purchase order in the "Quantity Received" column. The date received, and the signature of the person who received the items, shall be affixed. The triplicate purchase order then shall be *forwarded at once* to the office in which the purchase requisition originated.

When the triplicate purchase order is received by the office of origin of the requisition, it shall be compared at once with the quadruplicate purchase order. In the event the shipment is complete, the word "Complete" shall be written on the triplicate purchase order, the signature of the person responsible for the property shall be affixed and dated, and the triplicate purchase order *forwarded at once* to the Accounting Division at Salem. In the event the shipment is not complete, the office of origin of the requisition is to prepare an original only of a partial shipment receiving record, Form A-39, showing the description of *Items not shipped,* and other information as shown on the quadruplicate purchase order. *Do not copy quantities ordered.* The partial shipment receiving record then shall be sent to the consignee, and the triplicate purchase order shall be forwarded to the Accounting Division at Salem. The consignee will use the partial shipment receiving record for checking in the next shipment from the same vendor, and shall sign and date the receiving record and forward it promptly to the office of origin of the order. The office of origin shall compare the partial shipment receiving record with the quadruplicate purchase order, and, if the order has been completely shipped, shall write the word "Complete" on the partial shipment receiving record, the signature of person responsible for property shall be affixed and dated, and the partial shipment receiving record shall be forwarded to the Accounting Division at Salem. In the event the second shipment does not complete the order, the operation of a partial shipment receiving record shall be repeated. The Accounting Division at Salem shall consider a shipment incomplete, unless the triplicate purchase order, or the partial shipment receiving record, is plainly marked "Complete".

The Accounting Division at Salem will compare the receiving record with the quintuplicate purchase order, and the vendor's invoice, and will audit the quantities, prices, extensions, and total on the invoice. The cost distribution will be indicated on each copy of the invoice, and as soon as audited, a copy of the audited invoice will be forwarded by the Accounting Division at Salem to the field office which keeps the field costs for the jobs involved.

Please bear in mind that promptness on the part of each individual affected by this procedure will serve to speed up the payment of claims and the recording of costs on the accounting records.

In order to reduce the number of requests for changes in cost distribution indicated on the purchase requisition, the best available cost distribution will be indicated on the receiving record copy of the purchase order, whether such distribution is the same or different from that shown on the purchase requisition. The cost distribution shown on the receiving record will be transcribed to the copies of the invoices in the Salem office. Any changes which occur after the receiving record is forwarded to the Accounting Division, should be reported on Form A-87, Request for Transfer or Correction of Cost Distribution.

The above instructions govern the cost distribution on *purchase order receiving records* only, and in no way affect the procedure relative to changes in cost distribution on storeroom requisitions. Any changes in the cost distribution indicated on the latter are to be reported on Form A-87.

Article 29—Equipment Department Invoice

Equipment Department Invoice Form A-11 is designed so that the duplicate copy becomes a receiving record for the use of the Accounting Division at Salem, and the triplicate copy becomes a receiving record for the use of the Property Control Department. The form will show the equipment number and the cost distribution, opposite each item billed, and the cost value of each of the items billed, as well as the amount charged to the cost distribution. The cost value is for the use of the storerooms and the Accounting Division, and will not be used by other departments or field offices. The amount to be used by the field offices will be shown in the "Amount Charged" column. In case the cost distribution is the same for all items billed on one invoice, the amount charged will be shown in total, opposite the total of the cost value for all items.

The procedure requires that the cost distribution be shown on the storeroom requisition, Form A-33, at the time the requisition is prepared. The distribution so shown will be used by the Accounting Division in making distribution of the invoiced amount. In every instance in which it is possible, show the actual final cost distribution opposite each item on the requisition. On all requisitions for equipment parts, the cost of which are covered in the equipment department rental rate, distribution shall be by equipment number only, distribution by job prefix and account number not being required on requisitions of that kind.

The Equipment Department Office at Salem will prepare six copies of the equipment department invoice, Form A-11, retain the sextuplicate, and forward the other five copies as follows:

Original—To Accounting Division.

Duplicate and Triplicate—To Consignee as shown on invoice.

Quadruplicate—To be forwarded as follows:

When a Resident Engineer is the consignee, the quadruplicate is to be forwarded to, and retained by, the Resident Engineer.

When a Division Engineer or an administrative office in Salem is the consignee, the quadruplicate may be destroyed.

Quintuplicate—To Department Head or Division Engineer.

(The consignee, as used herein, denotes the person to whom the shipment is made.)

When the consignee receives the shipment, he shall count, measure, or weigh the items received, and write the quantities on the duplicate and triplicate copies of the equipment department invoice, in the "Quantity Received" column. The date received, and the signature of the person who received the items, shall be affixed. The duplicate and triplicate copies of the equipment department invoice then shall be forwarded to the person responsible for the property, who is to affix his signature on each of the duplicate and triplicate, and forward both copies at once to the Accounting Division at Salem. The space for the approval of the department head or Division Engineer on the equipment department invoice form is to be disregarded.

All signs, standards, barricades, stake bags, metallic tapes and small tools with a new value of less than one dollar shall be considered expendable and not carried on inventories. In determining whether an item is valued at one dollar use the "amount charged" column on the E.D.I. Cases for metallic tapes will be kept on the inventories.

Article 30—Bills Which Exceed $50.00 to be Accompanied by Form No. A-22

All bills for materials and supplies submitted in excess of $50.00 shall be accompanied by one copy of Form No. A-22. Only the statement of

certification, appearing on the lower portion of the form, is to be filled in. The form will be completed by the Accounting Division in Salem.

Article 31—Record of Tires

(a) Each tire sent out by the Equipment Department will be accompanied by an application form. As soon as the tire is applied, this form shall be filled out and mailed to the Equipment Department. Be absolutely sure that the information given on the form is correct.

(b) Whenever a tire is worn out and removed and sent to the Equipment Department, a tire removal tag (A-101) should accompany the tire. Also great care should be exercised that all the requested information is given correctly.

(c) Whenever a tire is transferred from one piece of equipment to another, the removal and application forms should also be made out, with proper notations on the forms that is is a transfer.

(d) Whenever a piece of equipment is checked out to the job, a tire record card, Form A-98, is placed in it. This card must be kept up to date and left in the equipment at all times.

(e) Whenever a tire or tires ordered on a storeroom requisition are applied on a different piece of equipment than that which was indicated on the original order the Construction Engineer shall be notified, through regular channels, to this effect, giving the requisition number and date the tire was received. This information is important for equipment cost records, which are not a part of the tire record; hence, it is essential that this information be submitted.

Article 32—Field Purchase of Car Batteries

No batteries shall be purchased in the field unless extreme emergency exists.

Article 33—Speedometers

It is essential that speedometers on State equipment be kept in working order at all times.

Article 34—Field Repairs to Equipment

Except in extreme emergencies, all repairs of consequene to State equipment shall be made by the nearest State shop. Refer to Section 16-26 relative to the procedure to be followed on emergency repairs.

Ordinary repairs, such as brake relining, engine tune-up or overhaul, etc., should be anticipated in advance and the nearest State shop notified in order that they may make the necessary repairs or arrange to replace the equipment needing repairs.

Article 35—Equipment Rental Report

Equipment Rental report, Form No. A-85 is to be prepared by the person in charge of equipment and submitted to the Division Engineer on the first day of each month. Instructions are printed on the face of the form.

Article 36—Transfer of Charges and Correction of Erroneous Cost Distribution

Form A-87, Request for Transfer or Correction of Cost Distribution, shall be used when making a transfer of an amount from one prefix and account to another prefix and account, or from one account to another account with the same prefix, whether it represents a transfer from a clearing account, or a correction of an erroneous entry. The data on Form A-87 shall be prepared by the office requesting the transfer or correction. The data at the top of the request shall show the office of origin and its headquarters address, the date of the request, information as to whether a transfer or a correction is being requested, the name and the number (if possible) of the document on which the original or previous charge or credit was made, and the date of that document.

The body of the request shall show the quantity, unit, and description of the items to be transferred, or corrected, the distribution and amount to be charged, and the distribution and amount to be credited. The total of the debit column must, of course, equal the total of the credit column. The reason for the request shall be stated in the space provided therefor, which reason shall include sufficient explanation to convey a clear idea of the circumstances occasioning the change or transfer requested.

When the request is originated by a Resident Engineer, Form A-87 shall be prepared in triplicate and signed by the Resident Engineer. The triplicate shall be retained by the Resident Engineer, and the original and duplicate forwarded to the division office. The Division Engineer will approve both copies, retain the duplicate, and forward the original to the respective Staff Engineer at Salem.

When the request is originated in a division office, Form A-87 shall be prepared in triplicate,

and all copies signed by the Division Engineer. The triplicate shall be retained in the division office; the duplicate forwarded to the District Maintenance Superintendent who is concerned with the accounts shown on the request, and the original forwarded to the respective Staff Engineer at Salem.

In each of the foregoing cases, when the original has been approved by the respective Staff Engineer, it shall be forwarded to the Accounting Division.

In the event that the charge distribution on a request affects one office, and the credit distribution on the same request affects a different office, an additional copy of the request should be prepared and approved, so that an approved copy of the request may be forwarded to each of the offices affected.

Form A-36—Revised—[illegible]

OREGON STATE HIGHWAY COMMISSION
PURCHASE REQUISITION
FOR FIELD OFFICES, FIELD CREWS, AND SHOPS

№ 23730

To REQUISITION OFFICE— Ontario, Oregon
July 2, 1945

Please order the following items to be delivered as stated hereon:

Ship to OREGON STATE HIGHWAY COMMISSION
Care of John J. Jones
Street P.O. Box 43-B
City Ontario, Ore.
Ship via Parcel Post

Signed [signature]
Approved ...., 19....
.... Division Engineer—Dist. Maint. Supt.
Approved ...., 19....
.... Maintenance Engineer

Send bill of lading to ....

All requisitions for construction materials of any kind must show the purpose for which the materials are to be used, and the order to which they are to be charged.

Quantity Ordered	Unit	DESCRIPTION	Cost Distribution
1	only	Electric Fan - 10" oscilating	3830-471
1	only	Electric Desk Lamp	3830-471

Approved for purchase request .... *Purchase request forwarded* ....
Purchase Request Number *Office Number*

Follow Instructions on Printed Slip as to Routing of Copies
ORIGINAL—Copy for Requisition Office

STATE PRINTING

Form A-39—[illegible]

OREGON STATE HIGHWAY COMMISSION
STOREROOM REQUISITION

№ 41265

To STOREROOM— Albany, Oregon
Sept. 21, 1944

Please furnish the following items to be delivered as stated hereon:

Ship to OREGON STATE HIGHWAY COMMISSION
Care of T.A. Mason
Street P.O. Box 118-B
City Albany
Ship via Parcel Post

Signed [signature]
Approved .... 19....
.... Division Head
Approved ...., 19....
.... Maintenance Engineer

Quantity Ordered	Unit	Shipped	Stock Number	For Description WRITE ONE ITEM ONLY ON EACH LINE	Amount to Be Billed	Unit Cost Price	Cost	V
1	only			Equip. No. 40-58; Cost Distribution; 6.00 X 16 Tire				
1	only			Equip. No. 40-58; Cost Distribution; 6.00 X 16 Tube				
1	only			Equip. No.; Cost Distribution 13-5052-900; 100 ft. steel tape				
20	yd.			Equip. No.; Cost Distribution 13-5052-900; 24" Imperial Tracing Cloth				
24	only			Equip. No.; Cost Distribution 13-5052-900; Wedge pencil tip erasers				
1	pad			Equip. No.; Cost Distribution 13-5052-900; Form # A 169 Price Agreement				
				Totals				

Date shipped .... Storeroom Invoice No. *Shipped via*
Date billed .... Filled by / Checked by / Storeroom No.

STATE PRINTING **TRIPLICATE—Copy for Division Engineer or District Maintenance Superintendent**

Form A-169—2500 sets—3-47

"A"

OREGON STATE HIGHWAY COMMISSION
REQUEST FOR RELIEF OF PROPERTY
Lost, Stolen, for Sale or Exchange
Worn-out or obsolete property is to be transferred to nearest shop on transfer of property Form A-49

To STATE PROPERTY COMPTROLLER:

I hereby request relief from responsibility for the following property located at ....

Quantity	Description	Total Cost		Per Cent Good	Present Value		Date and Circumstances
1	Plumb bob	1.	15	50		58	Fell out of scabbard into Umpqua River while cutting over-hanging brush. 5-15-50
1	Triangle - 12", 45°	1.	25	NG		NV	Disappeared from office and unable to locate when checking inventory.

CREDIT

If deduction is to be made please credit account No. 10-1461-900

I do solemnly swear or affirm that the articles of State property named hereon were lost (Lost, stolen, destroyed) in the manner stated while in State Service.

Approved: .... Division Head

John Doe — Person Responsible for Property
Locating Engineer — (Title)

[illegible], the person responsible for property is to retain goldenrod copy and forward four copies to his Division Head for approval. The Division Head will retain the buff copy and forward three copies to the Property Control Department where the request is to be reviewed and two copies forwarded to the Staff Engineer for his recommendation. The Staff Engineer is to forward the two copies to the Chief Engineer for approval, after which the two copies are to be forwarded to the State Property Comptroller for approval of the Board of Survey. White copy is to be returned to the person responsible for the property. Blue copy is to be forwarded to the Accounting Division.

Sworn to before me, and subscribed in my presence, this .... day of ...., 19....

NOT NECESSARY TO BE NOTARIZED

My commission expires ....

COPY FOR PERSON RESPONSIBLE FOR PROPERTY

Form A-[illegible]
STATE PRINTING DEPT.

OREGON STATE HIGHWAY COMMISSION
REQUEST FOR TRANSFER OR CORRECTION OF COST DISTRIBUTION

FROM: John M. Smith — Eugene, OREGON
TO: ACCOUNTING DIVISION— DATE June 30 1945
PLEASE Transfer (TRANSFER, CORRECT) THE FOLLOWING ITEMS WHICH WERE ORIGINALLY CHARGED ON
Payroll (survey party) (INDICATE NAME OF ORIGINAL DOCUMENT) NO. ________ DATE June 1945
________ (IF VENDOR'S INVOICE, WRITE NAME AND ADDRESS ON THIS LINE)

QUANTITY	UNIT	DESCRIPTION	CHARGE DISTRIBUTION	CHARGE AMOUNT		CREDIT DISTRIBUTION	CREDIT AMOUNT	
1	day	Time for George W. Brown	8011-568	5	33	12-3456-900	5	33
		Vacations & Sick Leave				12-3456-900		40
		TOTAL		5	33		5	73

REASON FOR THIS REQUEST: Vacation time taken June 30th after payroll was submitted

APPROVED: ________ DIVISION ENGINEER PREPARED BY: ________ CLERK
APPROVED: ________ STAFF ENGINEER APPROVED: ________ DISTRICT MAINT. SUPT.

ENTERED ON JOURNAL VOUCHER NO.: ________ ENTERED BY: ________
DATE ENTERED: ________

Form A-49—3500 Rev—5-41

OREGON STATE HIGHWAY COMMISSION

TRANSFER OF PROPERTY

Nº H16570

To T.A. Brown (Consignee—Person Responsible for Property)
Lakeview, Ore. (Address of Consignee)

Date June 26 19 45

To be used for transfer of materials, supplies, small tools and equipment not on rental. **This form must not be used for transfer of charges only.**

DESCRIPTION (Including Serial and Department Number)	Total Quantity	Average Per Cent Used	Unit Cost Price	Total Replacement Cost	Unit Price Present Value	Total Present Value
Curves, Spiral Celluloid 10" (set of 23)	1	45	32 45	32 45	14 60	14 60
Total						14 60

I hereby acknowledge having received from J.A. Doe (Consignor—Person Responsible for Property)
of OREGON STATE HIGHWAY COMMISSION, the above listed property valued at $ 14.60, to be used officially in connection with business of the State of Oregon and I agree to be responsible for said property until it is incorporated or consumed in the work of the State of Oregon, or returned, or I am otherwise relieved of such responsibility. Further, I understand that, in the event the property is lost, stolen or destroyed through my negligence, I may be held responsible, and may be called upon to reimburse the State for same.

Received at Lakeview, on the 27 day of June 1945

Signed T.A. Brown (Consignee—Person Responsible for Property)

Approved as to credit: ..... (Department or Division Head)

Title Leasing Engineer

Approved as to charge: ..... (Department or Division Head)

For Highway Dept. (Consignee, Department or Institution)

CHARGE Prefix	Function No	Amount
19-1453-900		14 60

Consignor to affix credit distribution, retain sixth copy and send five copies to consignor's department or division head for approval as to credit. Department or division head to forward five copies to consignee for signature. Consignee to affix charge distribution and forward five copies to consignee's department or division head for approval as to charge; copies then to be forwarded as indicated at the bottom of each.

1 COPY FOR ACCOUNTING DIVISION

CREDIT Prefix	Function No.	Amount
5915	900	14 60

OREGON STATE HIGHWAY COMMISSION

EQUIPMENT TRANSFER REPORT

Type of equipment Ford Sedan
Equipment No. 38-61

To John A. Doe
Address Baker, Ore.

Engine No. A-4534397 Serial No. Speedometer Reading 45,339
License No. E 4-245

TIRES, Size and percentage:
Front, Steerable Left 100 % Right 80 % Spare No. 1 40 %
Rear, Size " L. r. 100 % R. r. 100 % Spare No. 2 %
L. r. % R. r. % Sp. Wheel & Rim

LIGHTS: Fog, Spot, Clearance
Head, Stop, Snow, Special

GLASS: Front Upper Windshield Lower, Rear Yes, Ventilator
Side Front Yes Side Center Yes, Side Rear Yes, Special

TOOLS: Crank: (General) Hammer, Adjustable Yes, Skein
Hydr. Pump, Pliers Yes, Screwdriver Yes, Oil Can, Punch, Chisel
Jack Screw, Ratchet Handle Yes, Alem. Grease Gun, Zerk, Rose
Socket, Tool Box

ACCESSORIES: Bumper, Front Yes, Fwy. Marker Yes, Comp't Key No., Tire Cover, Ash Tray 1, Defroster Yes, Red Reflector, Loading Planks
Trunk, Tire Chains 2, Tire Card Yes, Tire Lock No., Mirror, Whisk Broom Yes, Radio Rcvr., Inflation Hose, Chain Tightener
Credit Cards Yes, Door Key No., W. S. Wiper 2, Horn Yes, Radio Trans., Trailer Hose, Flare Kit

SPECIAL ATTACHMENTS:

Speedometer Ford, Fuel Pump Ford, Air Cleaner Ford, Air Compressor, Vac. Brake Control Sedan, Body Sedan, Power Take-off, Canopy Top Yes, Radiator Yes
Carburetor Stromberg Yes, Fuel Gauge, Vacuum Tank, Distributor Ford, Generator Ford, Battery Yes, Oil Filter DeLuxe, Air Brake Gauge, Air Whistle, Hoist, Cab, Curtains, Cap, Tank
Gasoline Capacity 14 gallons, Blades ft., Fire Pipe Size in., Burners, Size, Burners, Size
Cylinder Oil Capacity 5 quarts, Scarifier Teeth, Hose, Type in., Hose, Type in., Hose, Type in.

RENTAL RATE: $ 33.00 per Month Effective 1-16-44

ADDITIONAL ITEMS
(This space to be used for items added in the emergency)

Date	Ref	Ref. No.	DESCRIPTION

I hereby acknowledge having received from ... with the business of the Oregon State Highway Department, and I agree to be responsible for said property until it is returned or I am otherwise relieved of such responsibility. Further, I understand that in the event the property is lost, stolen or destroyed through my negligence, I may be called upon to reimburse the State for same.

Received by ..... Date ..... 19..

Transfers from Shop — Consignor retains sixth copy, sending five copies to consignee at time of transfer, for signature. Consignee to sign and forward all five copies to Division Engineer to approve and forward all five copies to shop for signature and disposal as indicated at bottom of each.

Transfers to Shop — Consignor retains sixth copy sending five copies to Division Engineer for approval. Division Engineer to approve and forward all five copies to shop for signature and disposal as indicated at bottom of each.

Form A-49—826—8-43 STATE PRINTING DEPT.

ORIGINAL—Copy for Equipment Department Office

The above equipment and all tools assigned thereto, are received at Salem, Oregon

Received at Salem, Ore. 19 44

Signed E.F. Hyde (Person Responsible for Property)

Approved ..... (Division Engineer)

Date approved ..... 19 ...

Form A-49—826—8-41

OREGON STATE HIGHWAY COMMISSION

PARTIAL SHIPMENT RECEIVING RECORD

RECEIVED FROM State Electric Supply Co. Salem, Ore. Ontario, Oregon.

No. 21680 Use same number as shown on quadruplicate Purchase Order

QUANTITY RECEIVED	UNIT	DESCRIPTION	COST DISTRIBUTION
1	each	Lamp, Electric Desk, "Flexible Eagle"	3830-471

Complete

This copy is to be prepared by office of origin of order on which there is a partial shipment. Copy description of items not received, and information shown on quadruplicate Purchase Order, and forward to consignee. **Do not copy quantities.**

I certify that the items listed above were received by me in good condition and in the quantities as indicated.
Signed: .....
Date received 7/22/45

Consignee is to record quantities of items received, sign and forward to office of origin of order where this record is to be compared with Purchase Order, and then forwarded to accounting division.

STATE PRINTING

Form 41 1M 8-45

OREGON STATE HIGHWAY COMMISSION

EQUIPMENT DEPARTMENT INVOICE

Nº 161

SALEM, OREGON

John A. Doe
Elgin, Oregon

DATE BILLED 2/28/45
REQUISITION No. 5843/378
DATE SHIPPED 2/28/45

QUANTITY BILLED	UNIT	QUANTITY RECEIVED	DESCRIPTION	EQUIPMENT NUMBER	COST DISTRIBUTION	AMOUNT CHARGED	COST VALUE UNIT PRICE	COST VALUE AMOUNT
2	Pads	2	Traverse Sheets, Form E-58		1 05	.45		86
10	Only	10	Loose Leaf Rings		56	.C5		50
1	Only	1	OSHD Spiral Table Filler		82	.68		68
12	Only	12	Vermillion Pencils		86	.06		72
				TOTAL	53-1809-900	5 07	2	56

I HEREBY ACKNOWLEDGE HAVING RECEIVED THE PROPERTY AND SUPPLIES LISTED ABOVE, IS TO BE USED OFFICIALLY IN CONNECTION WITH BUSINESS OF THE STATE OF OREGON AND I AGREE TO BE RESPONSIBLE FOR SAID PROPERTY UNTIL IT IS INCORPORATED OR CONSUMED IN THE WORK OF THE STATE OF OREGON, OR RETURNED, OR I AM OTHERWISE RELIEVED OF SUCH RESPONSIBILITY. FURTHER, I UNDERSTAND THAT, IN THE EVENT OF SAID PROPERTY BEING LOST OR DESTROYED THROUGH MY NEGLIGENCE I MAY BE HELD RESPONSIBLE AND MAY BE CALLED UPON TO REIMBURSE THE STATE FOR SAME.

SIGNED (S) J.A. Doe DATE 2/28/45

(S) J.A. Doe
(Consignee is to enter name)

Locating Engineer
TITLE

TRIPLICATE—TO CONSIGNEE—(CONSIGNEE IS TO ENTER QUANTITY ITEMS RECEIVED AND RETURN TWO COPIES TO ACCOUNTING DIVISION AT SALEM. FOR PROPERTY CONTROL DEPARTMENT

FORM A85 7000 SETS--3-41

OREGON STATE HIGHWAY COMMISSION

EQUIPMENT RENTAL REPORT

HIGHWAY Wallowa Lake

CHARACTER OF WORK Engineering

SHEET NUMBER 1 OF 1 SHEETS

MONTH April, 1945

Equip. No.	Description / Speedometer Reading / Mileage for Period	Cost Distribution: Prefix	Cost Distribution: Account Number	Class	Days or Shifts Used	Total Days or Shifts	Rate	Amount	Total	Equipment Received or Transferred: Date	From or To
38-17	Ford Sedan	31-1809	900		X X X X X X X X X X X X X X X	15	22.50	11 25			From:
		31-1811	900		X X X X X X X X X X X X X X X	15	"	11 25			
	70,621										To:
	1183								22 50		
40-12	Chev. Station Wagon	31-1811	900		X X X X X X X X X X X X X X X	15	37.50	18 75		4/16/45	From: LaGrande Shops
	45,403										
	.622								18 75		To:
167432	K&E Transit	31-1811	900		Full Month	30	3.00	3 00			From:
									3 00		To:
7812	K&E Level	31-1809	900		Full Month	30	2.00	2 00			From:
									2 00		To:
											From:
											To:
											From:
											To:
											From:
											To:
											From:
											To:
								TOTAL OF ALL SHEETS	46 25		

INSTRUCTIONS

THIS REPORT TO BE PREPARED AT THE END OF EACH MONTH, SHOWING ALL EQUIPMENT ON RENTAL BASIS ON HAND AT THE CLOSE OF THAT MONTH, AND INDICATING ALL EQUIPMENT RECEIVED OR TRANSFERRED DURING THE MONTH, STATING FROM WHOM OR TO WHOM TRANSFERRED AND DATE

MAKE SEPARATE REPORT FOR EACH MAINTENANCE SECTIONMAN IN ORDER TO KEEP ACCURATE LOCATION RECORDS OF EQUIPMENT AND SIMPLIFY DISTRIBUTION OF CHARGES, USING TWO SHEETS OR MORE IF NECESSARY WITH A NOTATION IN UPPER RIGHT CORNER OF NUMBER OF SHEETS USED. SHOW RENTAL OF EQUIPMENT BY INDICATING THE SHIFTS WORKED IN SPACES UNDER THE PROPER DATES.

THE TRANSFER OF ALL EQUIPMENT OUT ON RENTAL MUST BE REPORTED ON FORM A-29.

THE SPEEDOMETER READING AND THE MILEAGE FOR THE PERIOD MUST BE GIVEN ON EACH CAR AND TRUCK REPORTED HEREON.

DISTRIBUTION: WHITE AND GOLDENROD COPIES TO EQUIPMENT DEPARTMENT. BUFF COPY TO THE DIVISION ENGINEER OR BRIDGE ENGINEER AND PINK COPY TO BE RETAINED BY PERSON SUBMITTING THE INVENTORY.

EQUIPMENT IN CHARGE OF: John A. Doe — ENGINEER--FOREMAN

LOCATED AT: Elgin, Ore — HEADQUARTERS

REPORT SUBMITTED BY: J. A. Doe — RES. ENGINEER--DIST. MAINT. SUPT.

REPORT CHECKED IN EQUIPMENT DEPARTMENT

(Back of form A85)

SUMMARY OF EQUIPMENT RENTALS

Description	Equip. No.	Rental	Cost Distribution Summary: Prefix	Account Number	Amount
Ford Sedan	38-17	22 50	31-1809	900	13 25
Chev. Station Wagon	40-12	18 75	31-1811	900	33 00
K&E Transit	167432	3 00			
K&E Level	7812	2 00			
	TOTAL	46 25		TOTAL	46 25

REMARKS:

ADM. PD7

STATE OF OREGON
FIELD PURCHASE ORDER

No. H

VENDOR (1)

DEPARTMENT (OREGON STATE HIGHWAY DEPARTMENT) (2)

1. SEND NOT LESS THAN 3 COPIES OF INVOICE TO DEPARTMENT.
2. ALL INVOICES MUST CARRY THIS PURCHASE ORDER NUMBER.
3. CHARGE ITEMS FURNISHED TO THE DEPARTMENT SPECIFIED.
4. PREPAY ALL TRANSPORTATION CHARGES UNLESS OTHERWISE STATED.
5. STATE IS NOT SUBJECT TO FEDERAL EXCISE TAX.

SHIP TO (3)

DATE (4)	DATE WANTED (5)	VIA (6)	B/L (7)	INVOICE TO (8)	COPIES (9)

REQ. NO. (10)	FUND (10a)	ACCT. NO. (10b)	CLASSIFICATION (10c)	PROJECT (10d)	FUNCTION (10e)	APPROPRIATION (10f)	YEAR (10g)

QUOTATION (11)	TERMS (12)	F. O. B. (13)	TO BE SHIPPED WITHIN (14)

QUANTITY (15)	DESCRIPTION (16)	PRICE (17)	AMOUNT (18)	ACCT. NO. (19)

I HEREBY CERTIFY THAT THE ABOVE ITEMS AS SET FORTH ARE NECESSARY AND ARE IN ACCORDANCE WITH THE CURRENT DEPARTMENT BUDGET ALLOTMENT.

(20) DEPARTMENT

BY _____ DATE _____

(20a) APPROVED BY _____ DATE _____

DEPARTMENT OF FINANCE AND ADMINISTRATION
PROCUREMENT AND SERVICE DIVISION

(21) AUTHORIZED AGENT

DATE

Oregon State Highway Commission

Tire Information Required for Each Tire

Fill out and send to the Equipment Department when Application is made.

Make Lee

Serial No. 88N24673

Size 6.00X16

Date Applied 3/29/45

Equipment No. 38-17

Speedometer Reading 76,542

Assigned to John A. Doe

Signed John A. Doe

Address Elgin, Ore

Date 4/2/45

FORM NO. A-98 2M 12-43

TIRE MILEAGE CARD

EQUIPMENT No. 38-17 DRIVER John A. Doe

TIRE NO.	MAKE	SPEEDOMETER READINGS ON	SPEEDOMETER READINGS OFF	SPEEDOMETER READINGS ON	SPEEDOMETER READINGS OFF	SPEEDOMETER READINGS ON	SPEEDOMETER READINGS OFF	TOTAL MILEAGE
977 43867	Firestone	37,365	46,871	53,906	68481	69538	76542	31,085
68Z 57964	"	41,405	55908	61,782				
A8745361	Lee	48672	61,782	62843				
A9277015	Lee	48672	62843	68481	69538			
657 56901	Firestone	46871	53906	55908				
88N24673	Lee	76542						

STATE PRINTING

Make Firestone Size 6.00X16

Serial No. 977 43867 Total Mileage Run 31,085

Removed from Equipment No. 38-17 Date 3/29/45

Remarks Worn out

From John A. Doe Address Elgin, Ore.

INSTRUCTIONS

This card is to be removed and held while this tire is in service. When the tire is taken out of service the data asked for is to be filled in and the card *mailed as addressed* on reverse side.

STATE PRINTING DEPT.

THE STATE OF OREGON

To .... Dr.

NOTE—All claims must state in detail dates of service, or date supplies were furnished, rate per day, month or year, or price per unit. Claims not showing these items will be returned for correction.

Date Vouchered	NATURE OF CLAIM	AMOUNT
	For .... *the Oregon State Highway Commission, as per details attached:*	$

Note: Fill in only statement of certification below, attach expense statement, bills, etc., and forward to the Division Engineer. (Form A-22)

CERTIFICATE

This is to certify that the goods, wares, or merchandise covered by this claim, or the services, cash advanced, or expenses herein set forth, have been received, rendered, expended or incurred, as the case may be, on behalf of the State of Oregon.

OREGON STATE HIGHWAY COMMISSION

By .... Claims Auditor

FOR USE ONLY OF DEPARTMENT OF STATE		
Audited and approved by	Prepared by:	*Total amount claimed,* $
Period covered	Checked by:	*Total amount allowed,* $
Items		

I, John O. Doe (Name)

hereby certify that I am Street Inspector (If firm or corporation, state capacity in which employed);

that I have knowledge of the above-described and attached claim; that the foregoing account is correct and just; that the service (Material or service) *therein specified* has been rendered (Has been furnished or rendered) *the State of Oregon as stated, that the charge therefor is reasonable, and that no part thereof has been heretofore paid.*

PERSON MAKING CERTIFICATION SIGN HERE John O. Doe (Name)

Warrant No. .... *issued in payment of the within claim.*

FORM A-51 30M SETS 1-46 STATE PRINTING

OREGON STATE HIGHWAY COMMISSION

SHOP GAS, OIL AND GREASE TICKET

SHOP AT *LaGrande* OREGON

EQUIPMENT NO. / LICENSE NO. *40-36* № 5525

SPEEDOMETER READING *61,074* DATE *3/13* 19*45*

	UNIT	QUAN.	UNIT PRICE	AMOUNT	
GASOLINE	GAL.	*10*	*17½*	*1*	*75*
OIL (S. A. E.)	QT.				
GREASE (KIND)	LB.				
KEROSENE	GAL.				
STOVE OIL	GAL.				
DIESEL OIL	GAL.				
TOTAL				*1*	*75*

RECEIVED BY *John Doe*

DELIVERED BY *Paul Roe*

COST DISTRIBUTION
FOR ITEMS NOT USED ON EQUIPMENT FOR MAINTENANCE WORK

5015-900

DUPLICATE—COPY FOR DRIVER OF EQUIPMENT TRANSFERRED TO THE FIELD, TO BE TURNED IN TO THE FIELD OFFICE. COPY FOR OTHER EQUIPMENT TO BE FORWARDED WITH ORIGINAL TO ACCOUNTING DIVISION

FORM A-19 125M SETS 11-44 STATE PRINTING

OREGON STATE HIGHWAY COMMISSION

GAS, OIL AND GREASE TICKET

CHECK IF STATE POLICE CAR . ☐ № 110001

CHECK IF OTHER CAR . . . . ☒

PUMP LOCATED AT *Redmond* PUMP NO. *6*

EQUIPMENT NO. / LICENSE NO. *40-36* DATE *3/15* 19*45*

	UNIT	QUAN.	UNIT PRICE	AMOUNT	
GASOLINE	GAL	*10*	*17½*	*1*	*75*
OIL (S. A. E.)	QT				
GREASE (KIND)	LB				
KEROSENE	GAL				
STOVE OIL	GAL.				
DIESEL OIL	GAL				
TOTAL				*1*	*75*

RECEIVED BY *John Doe*

DELIVERED BY *Sam Smith*

COST DISTRIBUTION
FOR ITEMS NOT USED ON EQUIPMENT FOR MAINTENANCE WORK

5015-900

ORIGINAL—MAINTENANCE PUMP ATTENDANT TO FORWARD TO DIST. MAINT. SUPT. PORTABLE PUMP ATTENDANT TO FORWARD TO MAINTENANCE ENGINEER.

SECTION 17. ESTIMATES AND REPORTS

Article

1. Division Engineer to Transmit Records.
2. Submit Corrected Estimates of Cost Prior to Letting.
3. Prepare Estimates for all Surveys.
4. Monthly Estimate on Contract Jobs.
5. Monthly Project Cost to Accompany all Monthly Estimates.
6. Final Records to be submitted on Construction Jobs.
7. Submit Detailed Report on Surveys.
8. Weekly Report for Surveys.
9. Weekly Report for Construction Projects.
10. Reports to be Made by Street Inspector.
11. Reporting of Quantities of Materials Used on Federal Aid Projects.
12. List of Forms.

Article 1—Division Engineer to Transmit Records

All original data, maps, profiles, cross sections, field notes, coordinate sheets, etc., are to be transmitted to the Division Office (under whose jurisdiction the project lies) upon completion or suspension of the project. The Division Office will transmit to the Salem office all records to substantiate estimates submitted and retain those records which in the opinion of the Division Engineer will be necessary to complete or extend the project.

Article 2—Submit Corrected Estimate of Cost Prior to Letting

It is very convenient to have a revised estimate of cost for contract jobs submitted about four days prior to the letting of the job. These costs should be corrected to cover any additional data which may have been received since the submission of the original estimate. Frequently the contractors indicate a like or dislike for certain jobs and point out features which would not have occurred to the Engineering Department. Care should be taken to reflect these opinions in the revised estimates, as it is quite important to have the estimate for the comparison of bids approximate the average bid received, and it invites considerable criticism to have our estimates entirely out of line with the bids. The Resident Engineer will submit such estimates to the Division Engineer for submission to the Salem office.

Article 3—Prepare Estimate for all Surveys

(a) *Quantity Summary to be Made by Miles*—For all reconnaissance, preliminary and location surveys, estimates of quantities and cost shall be made in as great detail as is consistent with the nature of the survey. On preliminary and location work, the estimate should be made up by miles summary and total shown on the profile and in the detailed report. The cost estimates should only appear in the report.

(b) *Indicate Design Features Used in Estimating*—All estimates should state clearly the basis upon which they are made; viz: width and type of roadbed and surface, side slopes in cut and fill, maximum gradient, minimum curve radius and whether the quantities are based on preliminary or location cross sections or by other means. Every estimate should be dated and signed.

(c) *Finishing Roadbed and Slopes, Trench Excavation and Structural Excavation*—All grading and regrading contracts will include bid items for "Finishing Roadbed and Slopes", "Trench Excavation" and "Structural Excavation".

The item "Finishing Roadbed and Slopes" will apply to the trimming and finishing of cut and fill slopes, the cleaning out of side ditches and such work as is necessary in finishing the roadbed, including shoulders, to grade and cross section. It will not apply to work that has been paid for under other bid items, such as preparation of roadbed for bituminous macadam or fine grading for pavements. In other words, it is intended to cover the final finishing of slopes, roadbed section, including side ditches, on grading and regrading projects only. This item will be paid for at the unit price bid per mile, the length to be measured to the nearest one-hundredth.

The item "Structural Excavation" will comprise and include all excavation for bridges, retaining walls, headwalls, box culverts, pipe culverts, siphons, sewers, tile drains and other structures (excepting curbs, gutters, pavements, sidewalks and like facilities which lie wholly above the subgrade).

"Trench Excavation" shall comprise and include all excavation for open ditches, excepting cut ditches, borrow ditches and other ditches in the roadway section and excepting channel changes in natural waterways.

(d) *List of Bid Items*—The following list may be used as a guide to avoid the omission of important features. All items in estimates are to be shown in the order listed.

1. Clearing and Grubbing.
2. Trench Excavation.
3. Structural Excavation.

4. Common Excavation.
5. Intermediate Excavation.
6. Solid Rock Excavation.
7. Short Overhaul.
8. Long Overhaul.
9. Finishing Roadbed and Slopes.
10. Rounding Cutbanks.
11. Culvert Pipe (small sizes first).
12. Drain Tile.
13. Rock Backfill.
14. Concrete, Class A, B and C.
15. Reinforcing Steel.
16. Rubble Masonry.
17. Riprap.
18. Catch Inlets.
19. Selected Roadbed Topping.
20. Bridge Structures.
21. Grade Crossing Elimination Structures.

(e) *List of Items to Accompany Estimate*—The following data and information shall be prepared by the Resident Engineer and submitted to the Division Engineer for each survey:

1. Detail Map. (See Section 11, Article 6.)
2. Vicinity Maps (See Section 11, Articles 10 and 11.)
3. Form E-273, "Bridge Construction Survey Data". (See Section 11, Article 11.)
4. Profile. (See Section 11, Articles 12, 13 and 15.)
5. Right of Way Descriptions. (See Section 9, Articles 13 and 14.)
6. Descriptions for Stockpiles, Quarries, Etc. (See Section 9, Article 2.)
7. Form E-47 to Accompany Each Description. (See Section 9, Article 4.)
8. Form E-29 to Accompany Each Description. (See Section 9, Article 15.)
9. Location Engineer's Right of Way Report. (See Section 9, Article 12.)
10. Field Notes. (See Section 9, Article 14, and Section 7.)
11. Coordinate Sheets. (See Section 11, Article 4.)
12. Form 525. (See Section 15, Article 10.)
13. Platted Cross Sections. (See Section 6, Article 11.)
14. Earthwork Computations. (See Section 5, Article 39, Section 6, Article 12, and Section 7, Article 8.)
15. Mass Diagram. (See Section 5, Articles 40-45.)
16. Estimate. (See Section 17, Articles 2 and 3.)
17. Preliminary Draft of Specifications. (See Section 1, Article 6.) *Note:* Item No. 17 is to be prepared by the Resident Engineer as an aid to the Division Engineer.
18. Detailed Report. (See Section 17, Article 7.)

Article 4—Monthly Estimates on Contract Jobs

The Resident Engineer shall prepare a monthly estimate for work performed under each contract. The prompt issuance and transmission of these estimates is to be a duty of first priority, and he shall see that they are completed, without fail, on the estimate closing date set for his area, and sent to the Division Office in the earliest mail possible.

A monthly estimate is to be submitted on the first closing date following completion of the project, as well as on closing dates prior to completion. Do not omit the monthly estimate at that time even though it is expected that the semi-final estimate will be ready for submission within a few days.

(a) *Dates to Prepare Estimate*—Estimates shall be made up on Monthly Estimate Form No. A-144, and the closing dates are as follows: Divisions 1, 2, and 3—the 10th of the month; Divisions 4 and 5—the 5th of the month. The Resident Engineer shall arrange his work to have these estimates in the mail on these dates.

(b) *Estimates to be Transmitted to the Division Engineer*—All monthly estimates shall be mailed by the Resident Engineer to the Division office for approval before transmission to the Salem office. Submit three copies for state projects and four copies for federal aid projects. (For semi-final estimates, submit four copies for State and five copies for Federal Aid projects.)

(c) *Number Estimates Consecutively*—Estimates for each job shall be numbered consecutively by beginning with the number "one".

(d) *List All Quantities Completed*—The quantities to be listed are the total quantities from the beginning of the job to the date of the estimate.

(e) *Show All Quantities in Detail*—The estimate sheet should show quantities in detail. Each culvert shall be listed separately, showing the amount of pipe, concrete, steel, structural excavation and all other items entering into its construction. Grading should be estimated in as small units as practicable; i. e., by individual cuts, by work handled by different sub-contractors, by sections of different classifications, etc.

(f) *Show Item in Proper Sequence*—Columns shall be headed with the same notation and sequence as they appear in the contract, as:

1. Clearing and Grubbing.
2. Trench Excavation.
3. Etc. (See Section 17, Article 3.)

(g) *Show Price Agreements on Estimates*—All price agreement items shall be shown on the monthly estimate sheet following the listing of the regular contract items. Force account items shall not be shown on this form. Form A-100 "Record of Extra Work Bills" shall be prepared and submitted with each estimate having extra work. (See Section 14, Article 3.)

(h) *Estimates Covering Federal Aid Projects*—In submitting estimates covering Federal Aid projects, a segregation of quantities between the State project and the Federal Aid project or projects should be made in accordance with the summary shown on the plans under the heading "Segregation of Quantities".

(i) *Allowance for Materials on Hand*—Allowance for materials delivered and held in storage on the job shall be made in conformance with the provisions set forth in Section 8-7 of the standard contract specifications.

(j) Because of the importance of getting monthly payments through to contractors promptly, every Resident Engineer shall make the prompt issuance and transmission of his monthly estimates a duty of first priority, getting them out, without fail, on the estimate closing date set for his area and making sure that the estimates go to the Division Office in the earliest mail possible.

Division Engineers should arrange to be at their offices at the time the estimates arrive from the Resident Engineers, and that each estimate goes forward to Salem on the same day that it is received. The holding back of some estimates so that all may be forwarded together is not desired.

Article 5—Monthly Project Cost Report to Accompany All Monthly Estimates

Monthly Project Cost Reports accompanying field estimates on contract projects are to be submitted on Form E-256.

The information is to be listed on the form in the manner illustrated on the sample sheet at the end of this section. Note, in particular, that all work under price agreements, orders for extra work and state force orders, is listed separately for each order, and the number of each order and a brief description of the work is given so that it may be easily recognized. Work that is to be performed under one of these classifications, but for which no order has been submitted, should be listed and described on the Monthly Project Cost Report.

Until such time as all contingencies have been definitely listed in the manner described above, an additional lump sum may be included as "Other Contingencies Anticipated", sufficient to cover all work which may be necessary to perform, but for which the Resident Engineer is not prepared to give a definite description or estimate of cost as it will appear on the order.

Engineering and State force expenditures will not be included in the column headed "Performed Since Last Estimate".

The information supplied on this form is used in compiling reports showing status of contract projects and in various other phases of office work. For this reason it must be accurate and dependable. The Resident Engineer will be expected to exercise every care in preparing the form and in correcting quantities and costs whenever necessary to show the correct ultimate cost of the project.

It is particularly important that the "Estimated date of completion" be determined with the greatest possible accuracy and be corrected each month as the work progresses.

Four copies of this report shall be made for both State and Federal Aid projects, three of which are to be submitted to the Division Engineer, who will retain one copy and forward the other copies to the Salem office after his approval. The fourth copy shall be retained by the Resident Engineer for his files. An extra copy of this report shall accompany the semi-final and final estimates.

Article 6—Final Records to be Submitted on Construction Projects

During the progress of the job, the Resident Engineer shall have a complete set of final records worked up and have them in such shape that they may be completed and turned in to the Division Engineer immediately after the construction work is finished.

Before submitting the final records, a final index of all the quantities shall be prepared. This index shall start with the first general item and shall take in each item consecutively through

the contract including the price agreements and those items, payment for which is set out in the contract, such as screen rejects, etc. The index shall give the station number, the book and page number of the notes and/or the book and page number of the calculations, if separate from the notes, of each and every miscellaneous item coming under the general contract items. The final index should be prepared in a form similar to the following sample:

(Sample)

FINAL INDEX

Bear Creek-Deer Creek Section

Pacific Highway

Job prefix 10-1108 Contract No. 2100

Item No.	*Estimate Sheet No.*	*Line No.*	*Book No.*	*Page No.*	*Quantity and Unit*	*Totals*
1	1	1	Clear and Grub.		100%	100%
2	1	14	1	8	2.4 c.y.	
2	1	15	1	9	3.3 c.y.	
2	1	18	1	12	38.5 c.y.	
2	1	21	1	16	26.4 c.y.	70.6 c.y.
3	1	14	1	8	4.5 c.y.	
3	1	15	1	9	8.1 c.y.	
3	1	16	1	10	24.2 c.y.	
3	1	17	1	11	8.7 c.y.	45.5 c.y.
4	1	2	3	12–18	1600.3 c.y.	
5	1	3	3	25–32	861.5 c.y.	
6	1	4	3	37–45	1243.7 c.y.	Etc.

(List all items in the above form. Miscellaneous items as follows.)

PRICE AGREEMENT No. 1

1	24	6	22	39 lin. ft.

EXTRA WORK ORDER No. 1

2	1	9	38	241.6 c.y.

PRICE AGREEMENT No. 2

1		6	73	620 lin. ft.
2		7	Pl. Sec. and Comp. sheet.	481.2 c.y.

If quantities, such as excavation for structures, are combined on the Final Estimate sheet, the final index should show the location of such quantities by station numbers.

The following final records must be submitted:

Construction map.

Construction profile.

Transit notes.

Platted sections.

Earthwork computation sheets.

Field notes.

Duplicates of material receipts and weight tickets.

Mass diagram.

Summaries, haul charts, sketches and other data pertinent to the computation and tabulation of the items which make up the final estimate.

Final estimate sheets. (Four copies to be submitted for State projects. Five copies to be submitted for Federal Aid projects.)

Quantity summary sheets. (Four copies to be submitted for both State and Federal Aid projects.)

Report of quantity of materials used on Federal Aid projects.

This list refers only to supporting data for the final quantities. Additional forms as required by the Department must be submitted.

Construction Map and Profile—At the completion of each grading job a map and profile shall be submitted as specified in Article 16 of Section 11.

Transit Notes—Transit notes should be submitted at the completion of all grading jobs and at the completion of surfacing, oiling and paving jobs when the alignment has been changed from the previous data on file in the Salem office. Corrections should not be made for small discrepancies, such as a few tenths in distance or a minute or two in angles, found in the previous alignment data. Such small discrepancies should be ignored and the original data adopted as being correct. The transit notes should show reference ties, ties to section corners and property lines, building ties, etc.

Platted Sections—Platted roadbed sections shall be made up on sheets of cross-section paper 11" wide (10" engraved) and 14" long, or longer sheets, if necessary, which will fold to 14 inches.

If the original ground notes and final grade or remeasure notes are taken and correlated to each other as outlined under "Field Notes", Section 7, Article 8, so that computations of areas can be made directly from the notes, platted sections will not be required. However, if the field notes are taken in such a manner that the correlation between the original and the finished section can only be shown on the platted section, then platted sections must be submitted and all data pertaining to the section must be transferred to the platted section and checked back to be sure it is right.

If the field notes are recorded so that areas may be computed directly thereform, platted sections need not be made up for stockpile sections or for drainage ditch and culvert excavation sections.

Field Notes—Field measurements or other data should be submitted in support of every item shown on the final estimate, including those items covered by price agreements. Price agreements cannot be accepted as final supporting data, as quantities shown thereon are always subject to correction.

Level notes should be recorded separately and not mixed with the regular cross section notes.

The loose leaf field notes should be made up into books not exceeding about one inch in thickness and on the cover of each book should be lettered the county, highway, section, contract number, prefix, dates, engineer's name, and the kind of notes contained in the book. On the first inside leaf of each book which covers a number of items should appear an itemized index of the book showing page numbers where each item is recorded.

Culvert notes should show the location with reference to highway centerline and the grade elevations. Notes for small structural excavations with vertical sides, such as small culvert and drainage excavation, are best if an average longitudinal section is taken, the area of which multiplied by the width of the trench gives the volume. When the notes for such sections are perfectly clear and legible, there is no need for platted sections.

On paving jobs through cities, sketches should be submitted to show pavement, driveway, sidewalk and curb removal. Separate sketches should be submitted to show new construction of driveways, curbs, and sidewalks and irregular-shaped pieces of pavement such as at street intersections. Sketches of irregular-shaped pieces of pavement should show clearly the expansion and contraction joints installed. The transit sheet is best for making up these sketches, using the right page for the sketches and the opposite or left page for the notes and computations.

Material Receipts and Weigh Tickets—Fill out tickets as per instructions attached to the book of tickets. In computing the haul on a load of material where the contents of the load are distributed in more than one-half-mile unit, compute the haul for that load as if the total load was distributed in the farthest unit.

Mass Diagram—When cross sections are taken close together, compute mass ordinates for points which are about fifty feet apart, ignoring the intermediate points. Do not compute balance lines closer than the nearest cubic yard ordinate or the nearest tenth in stations. Show distribution of material on the mass diagram and on the final construction profile. Each cubic yard hauled over 1,200 feet shall be credited with 6 yd. stas. of "Short Haul" in addition to the "Long Haul" computed.

In cases where there is much cross haul, occasioned by the use of materials for special purposes, such as wasting of poor materials or their placement in the bottom layers of embankments, the use of certain excavations as selected topping, or of rock for riprap, extra care must be taken in making the final mass diagram readable. In many cases it is better to make separate diagrams for the different materials. In all cases the distribution brackets must show all of the details of the haul, each different material having a distribution system of its own.

Haul Adjustments—A haul adjustment is caused by a change in the distribution of materials, i. e., by changing the amounts of material in the stockpiles or changing the locations of the stockpiles from the amounts and locations that were set out in the "Tentative Plan of Distribution". A change in the source or sources from any prospective source or sources which might be mentioned in the specifications does not cause a haul adjustment. If the materials are delivered in exact accordance with the "Tentative Plan of Distribution" there is no haul adjustment to be made, regardless of where the material was hauled from.

Miscellaneous Data—"Finishing Roadbed and Slopes" and "Preparation of Subgrade". Notes shall show all equations, length of bridges, or other data as required to support the final estimate as required by the Standard Specifications or the Special Provisions.

Haul data should give the station or mile point limits of the various units of haul. The lengths of hauling roads, equations in stationing and all data necessary to check the station limits of the haul units should be given. Haul should be computed from the quarry, pit, or unloading point if shipped by rail or boat direct to the point of deposit; not from the crushing or processing plant, except in the case of screen rejections. See Section 24-6 of the General Specifications.

Haul for screen rejects should be computed from the bunkers or the point where they are delivered into trucks to be hauled out to the stockpile. When screen rejects are taken in State trucks at the contractor's bunkers, there is no pay item.

We have no standard specification which covers hauling screen rejects onto the road by the contractor other than as filler material. If screen rejects are used on the road other than as provided in the specifications, a price agreement must be executed to provide for payment for same.

Summaries—On all jobs which have a large number of items such as paving jobs through cities, a final summary or index of all the items shown on the estimate shall be submitted.

The earthwork computation sheets should show the final areas and volumes of the roadbed and borrow sections, the mass computations and summary of the pay excavation.

Engineer Held Responsible for Records—The Resident Engineer will be held strictly responsible for the accuracy of all final notes and records and shall see that they are carefully checked and indexed before he turns them in to the Division Engineer's office.

Overrun or underrun of Contract Items—One of the requirements of the Government on all Federal Aid projects is to furnish them with an explanation of all items for contracts which vary 10 per cent or more from the preliminary estimate. This explanation is to cover overruns as well as underruns.

Resident Engineers shall check semi-final estimates carefully at the time of transmittal to the Division Office and shall include with the record sent the Division Office a comparison of bid and final amounts on all items. All items on each contract shall be listed, showing the bid item, the final amount, the percentage of variation, and as such remarks as might be pertinent to the various differences.

Construction Engineer's Statement—Two copies of "Construction Engineer's Statement" form will be submitted with the final records for each job.

Letter of Transmittal—A copy of the letter of transmittal for final records shall be marked "Attention: Checking Engineer" and be enclosed with the letter to the Division Engineer.

Article 7—Submit Detailed Report on Surveys

A detailed report shall be prepared by the Locating Engineer upon the completion of every survey. This report should contain all information in connection with the survey that cannot be shown upon the maps and other records submitted. It should also contain a general summary of the important features shown in detail on the maps and other records.

It should state the purpose of the survey, describe its limits and the locality traversed, describe other possible routes, outline the methods of survey and the various considerations entering into the selection of the route, and the adoption of particular types of construction, with suggestions as to the procedure necessary to prepare the work for construction, giving such information in regard to the attitude of property owners and citizens as has been obtained locally or otherwise, describe all possibilities of future trouble in securing rights of way, crossings of railroads, navigable streams, etc. It should contain a tabulation of the costs of the survey, showing the costs of the different items involved and giving the per mile costs of the field and office work. It should also give a summary of such important features as length of line, type of roadbed, maximum gradients, maximum degree of curve, estimated cost of construction (total and per mile) and any recommendations deemed necessary.

This report should give complete status of survey covering such points as:

How much of the line has been staked and referenced?

Have the 100′ and 400′ maps, profile tracing, vicinity maps and descriptions been finished and mailed to Division Office?
Where are the notes, coordinate sheets, cross sections, mass diagram, etc?

This report is to be accompanied by a letter size sketch map showing the location of and giving a description of all buildings within the proposed right of way.

The body of the report shall cover in complete detail the conditions that make it necessary to hit such buildings.

Article 8—Weekly Report for Surveys (Form E-114)

A "Field Engineer's Weekly Report for Surveys Only", Form No. E-114 shall be prepared, covering a full calendar week, and placed in the mail so that a copy will reach the Construction Engineer in Salem not later than Monday morning of the following week.

The back of the form should be completely filled in and the text of the report should give a comprehensive picture of the activities of the party and the progress of the survey for the foregoing week. Changes of personnel should be noted, stating the effective date of starting or leaving, position held, and other pertinent information.

Upon completion of a survey, the last weekly report shall be marked "Final Report". The last report for surveys that are to be suspended for a considerable length of time shall be marked "Deferred Report".

One copy of the above report is to be submitted to the Division Engineer and one copy to the Construction Engineer at Salem.

Article 9—Weekly Report for Construction Projects (Form No. E-1)

A report shall be prepared each Saturday to cover the preceding week, on Form No. E-1, "Field Engineer's Weekly Report for Construction Projects Only". These reports are to be mailed so that the Salem office will receive one copy by the Monday morning following. Be sure to give accurate estimates of:

Date of completion.
Per cent of time elapsed.
Per cent of contract completed.
Engineering cost to date.

Indicate the progress of the contractor and any special instruction which you have given during the week. Indicate the progress of the engineering party and any changes in personnel, stating the effective dates of starting or leaving, position held, and any other pertinent information. Fill in the information requested on back of form, including a daily record of the weather and the amount of delay caused therefrom, as differentiated from other delays. Mail one copy direct to the Division Engineer in charge and one copy to the Construction Engineer at Salem.

Article 10—Reports to be Made by Street Inspector

It is the duty of the street inspector to make out the following report:

(a) Concrete Paving Inspector's Daily Report, Form No. E-81 (Section 13, Article 49).

This form is to be made out at the end of each day's work. Be sure to get the contractor or his representative to sign in the proper place for the amount of cement used.

Article 11—Reporting of Quantities of Materials Used on Federal Aid Projects

Compliance with Federal requirements makes it necessary, at the completion of each Federal Aid contract, to provide the Bureau of Public Roads with a statement showing the quantities of certain kinds of materials used by the contractor in the performance of the work. The contractor is required to maintain a record of the total cost of all materials purchased for and incorporated in the work and also the quantities and costs of the specific materials and supplies purchased for the project, as outlined and listed in the section "Record of Materials and Supplies" of the Additional Contract Provisions. Upon completion of the contract, these quantities and costs are to be obtained by the Resident Engineer from the contractor, or other sources, and are to be listed by him on Form No. PR 47-A (Rev.) "Statement of Materials and Employment".

At or near the completion of the project the Resident Engineer will receive, from the Salem office, two copies of the above named Form PR 47-A, together with a letter of instructions. Upon completion of the projects the Resident Engineer shall complete these forms as outlined in the letter of instructions, retain one copy for his files and submit the other copy to the Salem office as soon as possible. This copy should be in Salem not later than a week or ten days after the project is completed.

It should be noted that certain items of the information called for by the form are not to be filled in by the Resident Engineer. This information will be added at the Salem Office.

The reports are not required for projects on which the Federal government is not cooperating.

The following tables will be of assistance in the computation of the quantities of cement, aggregates and steel furnished in the form of concrete pipe. The weights for different sizes and gauges of corrugated iron pipe are also given in the tables.

QUANTITY CONVERSION TABLES TO BE USED IN PREPARING REPORTS ON FORM PR 47

Gives approximate quantities of materials in concrete and corrugated iron pipes

I. CONCRETE PIPE

STANDARD STRENGTH

Pipe Size	Shell Thickness	Approx. Quantities Per Foot: Cement Bbls.	Aggregates C. Y.	Reinf. Steel Lbs.
12"	2 "	.036	.029	.....
15"	2¼"	.049	.041	1.69
18"	2½"	.065	.054	2.55
24"	3 "	.103	.085	4.81
30"	3½"	.149	.123	6.26
36"	4 "	.204	.168	7.83
42"	4½"	.267	.220	10.35
48"	5 "	.338	.278	14.62

EXTRA STRENGTH

Pipe Size	Shell Thickness	Approx. Quantities Per Foot: Cement Bbls.	Aggregates C. Y.	Reinf. Steel Lbs.
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
18"	2½"	.065	.054	4.38
24"	3 "	.103	.085	8.41
30"	3½"	.149	.123	10.14
36"	4 "	.204	.168	14.60
42"	4½"	.267	.220	19.87
48"	5 "	.338	.278	25.94

II. CONCRETE SEWER PIPE

Pipe Size	Shell Thickness	Approx. Quantities Per Foot: Cement Bbls.	Aggregates C. Y.
3"	½"	.002	.002
4"	⅝"	.004	.003
6"	¾"	.006	.005
8"	⅞"	.010	.008
10"	1 "	.014	.012
12"	1¼"	.021	.017
15"	1½"	.032	.026
18"	1¾"	.044	.036
21"	2 "	.059	.048
24"	2¼"	.075	.062

III. CORRUGATED IRON PIPE

Pipe Size	Gauge Number	Weight in Lbs. Per Foot
8"	16	7.4
9"	16	8.3
10"	16	9.2
12"	16	10.8
15"	16	13.1
18"	16	15.7
21"	16	18.4
24"	14	25.4
30"	14	31.9
36"	12	52.0
42"	12	60.6
48"	12	70.6
54"	12	79.0
60"	10	109.1
66"	10	119.7
72"	10	130.2
78"	8	176.5
84"	8	189.6

NOTE: The above tables, on concrete pipe, giving quantities of cement and aggregates per lineal foot of pipe were based on the assumption that one cubic yard of concrete contains 1.58 bbls. of cement and 1.3 cu. yds. of aggregates. The standard strength pipe is a combination of Tables 14 and 15 shown on page 114 of Standard Specifications, issue of September 15, 1940. The weight of steel was computed on the basis of one foot of one inch square reinforcing steel weighing 3.4 lbs. per foot. The sizes, gauges and weights of corrugated iron pipe were taken from the Oregon Culvert and Pipe Company's List No. P-5.

Article 12—List of Forms

Form No.	Form Name	Number of copies of form to be submitted to the Division Engineer	Instructions Sec. and Art.
	CONSTRUCTION FORMS		
E-299	Authority to Over-run Contract Amount	†	14–5
E-81	Concrete Paving Inspectors Daily Report	*	13–49
E-1	Field Engineers Weekly Report for Construction projects only	†	17–9
A-144	Monthly Estimate		
	State projects	3	.....
	F. A. projects	4	17–4
	Final—		
	State projects	4	.....
	F. A. projects	5	.....
E-233	Notification of Commencement and Completion of Work	†	13–5
PR-100	Contractor's Weekly Payroll Summary	†	13–6
PR-200	Cont. Report of Employment	†	13–6
Mimeo.	Weekly Affidavit Form	†	13–6
A-191	Request for Outside Billing	†	14–11
E-189	Order to Render Service	†	14–10
E-208	Order for Extra Work	6	14–3
A-105	Order for State Force Work	6	14–4
A-169	Price Agreement	6	14–2
E-256	Monthly Project Cost Report Sheet—		
	State projects	3	17–5
	F. A. projects	3	17–5
	Final—		
	State projects	4	17–5
	F. A. projects	4	17–5
Mimeo.	Request for Extension of Contract Time	3	13–15
A-100	Record of Extra Work Bills	4	14–3
A-139	Project Authorizations and Record of Work Orders	†	14–8
A-87	Request for Transfer or Correction of Cost Distribution	2	16–36
PR-47A	Statement of Materials and Employment	†	17–11
E-71	Sample Data Sheet	*	15–4
E-76	Sample Data Sheet (Bituminous Mixture)	*	15–4
Mimeo.	Construction Engineer's Statement	2	17–6
87 FF	Daily Plant Report—Bituminous Mixtures	*	13–45

Form No.	Form Name	Number of copies of form to be submitted to the Division Engineer	Instructions Sec. and Art.
	EQUIPMENT AND SUPPLY FORMS		
	Drivers' Preliminary Report (Insurance Company Form)	†	1–17
A-11	Department Invoice	†	16–29
A-29	Equipment Transfer Report	*	16–5
A-85	Equipment Rental Report	*	16–35
ADM-PD 7	Field Purchase Order	†	16–26
A-81	Gas, Oil and Grease Ticket—Shop Pump	†	16–21
A-15	Gas, Oil and Grease Ticket—Maintenance Pump	†	16–21
A-173	Memorandum Receipt	†	16–27
A-34	Purchase Requisition	3	16–4
	Purchase Request and Order	†	16–28
A-39	Partial Shipment Receiving Record	†	16–28
	Report of Accident (Insurance Company)	†	1–17
A-182	Request for Relief of Property Lost, Stolen, for Sale or Exchange	4	16–10
A-87	Request for Transfer or Correction of Cost Distribution	2	16–36
A-33	Storeroom Requisition	†	16–4
A-22	State Highway Fund Claim	1	16–30
E-302	Request for Authorization to Move Household Effects	†	1–26
OD-32	Traffic Accident Report—Department of State	†	1–17
A-49	Transfer of Property	*	16–6
Mimeo.	Tire Application Form	†	16–31
A-101	Tire Shipping Tag	†	16–31
A-98	Tire Mileage Card	†	16–31
	PAY ROLLS AND ABSENCES		
A-80	Acknowledgment of Receipt of Time Check	†	2–10
A-94	Acknowledgment of Receipt of Pay Check	†	2–14
A-248	Time Report	3	2–3
A-219	Physician Certificate	1	2–2
A-220	Report of Exchange Time Worked	2	2–2
A-57	Record of Time Checks Issued	†	2–11
A-58	Statement of Absent Time	2	2–5
507	Signature Certification	†	2–8(d)
A-198	Time Statement	†	2–8
A-27	Record of Time Checks Issued	†	2–12

Form No.	Form Name	Number of copies of form to be submitted to the Division Engineer	Instructions Sec. and Art.
	PERSONNEL FORMS		
20	Accident Claim—S. I. A. C.	†	3–7
CS-100	Employment Application	†	4–2
W-4	Dependency Status Report (Inter. Revenue)	†	2–7
A-23	Expense Statement	3	1–18
CS-124	Transfer of Employees	†	4–6
CS-124	Termination of Employment	†	4–8
A-201	Tax Exemption Certificate	†	1–18
RS-7	Personnel Record and Claim for Prior Service	†	3–10
RS-A25	Notice of Election	†	3–10
RS-A19	Notice of Employment	†	3–10
RS-A31	Notice of Withdrawal	†	3–10
RS-M2	Application for Service Retirement Allowance	†	3–10
RS-M1	Application for Disability Allowance	†	3–10
A-250	Per Diem Expense Allowance Statement	3	1–19
	RIGHT OF WAY FORMS		
Mimeo.	Locating Engineers Right of Way Report	2	9–12
E-29	Original Authorization for Negotiation	2	9–15
Mimeo.	Report on Proposed Abandonment of Highway Right of Way	2	9–18
E-31	Right of Way Descriptions—Metes and Bounds	2	9–13
E-151	Right of Way Description—Center Line	2	9–13
E-47	Statement of Information	3	9–4
	SURVEY FORMS		
E-39	Authority for Surveys	3	5–1
61	Bridge Construction Survey Data	1	11–11
E-114	Field Engineers' Weekly Report for Surveys	†	17–8
A-87	Request for Transfer or Correction of Cost Distribution	2	16–36
E-71	Sample Data Sheet	*	15–4
525	Statement of Material Sources and Stockpile Sites	4	15–10
E-38	Traverse Sheets (coordinates)	†	11–4
Mimeo.	Report on Bench Mark Recoveries	3	5–31
Mimeo.	Locating Engineer's Statement	2	5–45
E-185	Description of Bench Marks	1	5–31
E-186	Report on Condition of Bench Marks	1	5–31

* See Instructions printed on the form.
† See Instructions in this manual.

			1	2	3	4	5	6	8	9	P.A. #2						
	Sheet 1 of 1 Sheets STATION TO STATION		Clearing and Grubbing All Spec.	Structural Excavation, Unclassified Cu.Yd.	General Excavation, Unclassified Cu.Yd.	Short Overhaul Yd.Sta.	Long Overhaul C-Yd.Sta.	18-inch Corrugated Metal Pipe Lin.Ft.	Class "A" Concrete Cu.Yd.	Metal Reinforcement Lb.	Cement Adjustment in Favor of Contractor Bbl.						
1	0+00	239+66.6	85%														1
2	80+50	105+20			12,000	250,200	1,350										2
3	107+40	109+50			8,400	35,000											3
4	111+60	151+75			300,000	724,350	30,780										4
5	152+85	175+17			32,300	43,500	1,250										5
6	235+40	238+50			36,300	242,530	1,500										6
7	2+15			135.63				90									7
8	37+45			237.77				108									8
9	83+17			127.90				220									9
10	105+60			93.21				180									10
11																	11
12	152+50			348.39					28.30	3,752	6.5						12
13	220+19			319.17				220									13
14	235+30			57.23				140									14
15	238+75			71.70				206									15
16																	16
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40																	40
	Total Quantities to Date		85%	1,391.00	389,000	1,295,580	34,880	1,164	28.30	3,752	6.5						
	Quantities Previously Estimated		70%	715.70	232,000	359,240	10,464	204	21.00	3,752	- -						
	Quantities Handled Since Last Estimate		15%	675.30	157,000	936,340	24,416	960	7.30	- -	6.5						

NAME OF SUBCONTRACTOR OR OTHER PARTY PERFORMING WORK

SAMPLE COPY

Form A-144—6M—10-51

OREGON
STATE HIGHWAY DEPARTMENT
SALEM, OREGON

Monthly Estimate

Contract No. 3900 Estimate No. 3

Job Prefix No. 6-1045

Fed. Aid Proj. No. BF-141 (13)

Work done to May 10, 19 53

Kind of work Grading and Topping
(Grading, Surfacing, Paving)

Section Hauser-Coos Bay

Highway Oregon Coast

County Coos

Contractor C. R. O'Neil

Work begun February 20, 19 53

Work completed ...., 19......

Correct ....
Resident Engineer

Approved ....

STATEMENT OF CONSTRUCTION MATERIALS ON HAND

Item	Unit	Allowable Unit Price	Quantity	Amount
3" - 0 Base Material	Cu. Yd.	$0.75	15,000	$11,250.00
			Total	

STATEMENT OF DEDUCTION ITEMS

Description	Total Amount to Date	Previous Amount	Amount Since Last Estimate
12" Concrete Pipe supplied to Contractor to be placed under P.A. #1	$45.00	- -	$45.00

INSTRUCTIONS

Submission of Estimates:

Monthly estimates shall be prepared and submitted upon dates established by the Office Engineer for each particular job. The number of copies to be prepared shall be four. The Resident Engineer shall retain one copy, forwarding all other copies to the Division Office. The Division Office will retain one copy, forwarding the remaining copies to the Salem Office. One copy will be retained by the Salem Office, one forwarded to the contractor. One extra copy shall be submitted with semi-final estimates.

Copies of Monthly Estimates furnished contractors will not be considered official unless submitted through the Division and Salem Offices.

Preparation of Estimates:

Show quantities in detail; split the work up into units which will be readily recognized by the Division Engineer and contractor to enable them to check up the estimate in a general way to see that all work done is included. List each culvert by itself, showing the excavation, pipe, concrete, steel, etc., entering into its construction. Show clearing and grubbing as a percentage of the total amount for the job. For this one item, do not split your work into sections, as payment must be made as a percentage of the whole. Head columns clearly listing items in the order in which they are shown in the contract using the item names exactly as given therein. State sizes and give units of measurement. Mark decimal points distinctly. List all subcontractors in the last column.

Quantities to be shown on estimates are total quantities to the date of the estimate, not simply the quantities moved since the last previous estimate.

Allowances for Material on Hand:

The contractor will be allowed payment upon materials delivered upon the work, and as a basis for such payment the Resident Engineer will show in the place provided on the estimate form the amounts of materials actually on hand at the date of the estimate. Only non-perishable materials entering into construction, which materials have been purchased direct by the contractor, shall be listed. Fuel, equipment, contractor's supplies and materials of similar nature should not be included. Neither should materials furnished to the contractor by the State or County.

List on each estimate the quantities actually on hand at the date of the estimate, and not yet incorporated in the work, regardless of any previous estimates. These quantities are not cumulative and have no relation to each other from month to month.

Advances on materials are intended to cover only the larger items, and Resident Engineers should not list materials on hand unless they represent a value of at least $500.

In estimating the unit prices to be applied to the various items, the allowance should not exceed 90 per cent of the unit cost to the contractor.

Statement of Deduction Items:

If any labor, materials, or equipment is furnished to the contractor through the Resident Engineer's Office, or any freight charges are paid by the State, the Resident Engineer will list the items in the space headed "Statement of Deduction Items" on his estimate sheets, and the deductions will be made from the payments to the contractor in the Salem Office.

STATE PRINTING 52704

Form E-256—25008

OREGON STATE HIGHWAY DEPARTMENT—MONTHLY PROJECT COST REPORT

SAMPLE COPY

Section Hauser-Coos Bay **County** Coos **Work done to** May 10, 1953 **Estimate No.** 3

Kind of work Grading and Topping **Highway** Oregon Coast **Specified date of completion** Sept. 30, 1953 **Contract No.** 3900

Contractor C. R. O'Neil **Date of award** January 18, 1953 **Estimated date of completion** Sept. 10, 1953 **Job prefix** 6-1045

Item	Unit	Unit Price	Original Authorization		Estimate Corrected to Date		Performed to Date		To Complete Project		Performed Since Last Estimate	
			Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
1. Clearing and Grubbing	Lump Sum		All Spec.	$ 36,000 00		$ 36,000 00	85%	$ 30,600 00	15%	$ 5,400 00	15%	$ 5,400 00
2. Structural Excavation, Unclassified	cu.yd.	$ 3 00	1,540	4,620 00	1,398.5	4,195 50	1,391.0	4,173 00	7.5	225 00	675.3	2,025 90
3. General Excavation, Unclassified	cu.yd.	0 45	563,000	253,350 00	563,000	253,350 00	389,000	175,050 00	174,000	78,300 00	157,000	70,650 00
4. Short Overhaul	yd.sta.	0 01	1,661,000	16,610 00	1,661,000	16,610 00	1,295,580	12,955 80	365,420	3,654 20	936,340	9,363 40
5. Long Overhaul C	yd.sta.	0 40	43,600	17,440 00	43,600	17,440 00	34,880	13,952 00	8,720	3,488 00	24,416	9,766 40
6. 18-inch Corrugated Metal Pipe	lin.ft.	4 00	1,200	4,800 00	1,164	4,656 00	1,164	4,656 00	- -	- -	960	3,840 00
7. 3" - 0 Material in Base	cu.yd.	1 75	24,000	42,000 00	24,000	42,000 00	- -	- -	24,000	42,000		
8. Class "A" Concrete	cu.yd.	50 00	30	1,500 00	28.30	1,415 00	28.30	1,415 00	- -	- -	7.30	365 00
9. Metal Reinforcement	lb.	0 12	3,800	456 00	3,752	450 24	3,752	450 24	- -	- -		
(Subtotal, Contract Bid Items)				$376,776 00		$376,116 74		$243,274 54		$133,067 20		
Adjust Water System (EWO #1)				500 00		500 00		- -		500 00		
Seeding Slopes (S.F.O. 224)				1,500 00		1,500 00		- -		1,500 00		
Contingencies				17,044 92		6,067 89				6,067 89		
Engineering				30,302 08		25,685 00		12,392 85		13,292 15		
P.A. #1: Install 12" Conc. Pipe	lin.ft.	2 50			60	150 00			60	150 00		
P.A. #2: Cement Adjustment (in favor of Contractor)	bbl.	4 50			6.5	29 25	6.5	29 25	- -	- -	6.5	29 25
Totals				$426,123 00		$410,248 88		$255,671 64		$154,577 24		$101,439 95

Instructions: If an increase in construction authorization has been approved by the Highway Commission show the amount of the increased authorization for construction in space "a" to the right. If the "estimate corrected to date" exceeds the amount of the approved authorization for construction show the per cent of overrun in space "b".
Do not include "materials on hand" in any amounts shown on this form.

(a)

(b)

....., Engineer in Charge

Form E-116—4M—7-44

OREGON STATE HIGHWAY DEPARTMENT

FIELD ENGINEER'S WEEKLY REPORT FOR SURVEYS ONLY

Date Dec. 31, 1944

Job name Bear Creek Section — Week from Dec. 24 to Dec. 31

Mail address Roseburg

Highway Umpqua — Telegraph or telephone address Roseburg

County Douglas — Job Prefix 10-1497 — Express and freight address Roseburg

General information covering progress of work by party and important developments, instructions from Division Engineer, changes in personnel of party, etc.:

The transit party has completed the located line to station 1170 and the levels and topography are complete to station 1160. All right of way stakes, section ties and referencing has been kept up to date. As the party now has to walk five miles to work, it will take most of the coming week to finish the "L" line.

Weather conditions have been fair for this time of the year, with rains and occasional snow, but not enough to seriously interfere with the work.

The office work has progressed steadily. The location cross sections are plotted to station 970. Quantities are balanced to station 950. The profile is up to date with the field work. Both the 100 foot and the 400 foot maps are up to date. The 400 foot tracing is 60 % complete.

The LZ revision is nearly complete and will be mailed to Salem the first of next week.

Transferred Bill Brown and Sam Jones, chainmen, to B. B. Black at at Reedsport on Wed. the 27th.

Signed S. O. Engineer

Title Locating Engineer

USE BACK IF ADDITIONAL SPACE IS REQUIRED

Day of Week	WEATHER CONDITIONS A. M.	P. M.
Sunday	snow flurries	
Monday	rain and snow	
Tuesday	clear	
Wednesday	cloudy	
Thursday	unsettled	
Friday	rain and snow	
Saturday	snow	

INSTRUCTIONS

This form is required to be submitted by all Locating Resident Engineers. Separate reports must be submitted for each job, and no single report shall cover more than one job.

Reports shall be mailed by not later than Sunday night. The original copy shall be mailed direct to the Salem office and the duplicate direct to the Division Engineer. The triplicate copy shall be retained in the Field Engineer's files.

DO NOT include in weekly reports matters requiring action by, or the special attention of, Division Engineers or others, unless these matters are also taken up by a letter addressed to the attention of the party interested. Requisition for supplies, calls for men, requests for information and other matters requiring action or reply will NOT receive attention, if made on this form.

Fill out those sections of the above detailed reports which apply to the particular class of work involved under the job covered by the report.

SURVEYS

Total mileage of section to be surveyed	11.5
Miles of preliminary staked	18.7
Miles of location staked	10.9
Per cent of field work complete	90
Per cent of office work complete	70
Number of days worked on this project	76
Number of men in party	18
Salary expense this week	$500.00
All other expenses this week	$25.00
Previous total expenditures this survey	$6,300.00
Total expenditures including this week	$6,825.00
Survey will be completed about	Feb. 15, 1945
Completed survey will cost about	$8,000.00
Per mile cost of survey will be about	$700.00

STATE PRINTING

Form E-1—4M—6-44

OREGON STATE HIGHWAY COMMISSION

FIELD ENGINEER'S WEEKLY REPORT FOR CONSTRUCTION PROJECTS ONLY

For Week Ending July 28, 1945

Section Deer Creek - Bear Creek — Kind of work Grading & Bit. Macadam Surfacing

Highway Pacific — Section prefix 17-1109

Contractor A & B Construction Co. — Contract number 2683

Date of contract May 15, 1945 — Date of completion July 31, 1946

Date work started May 21, 1945 — Estimated date of completion July 31, 1946

Amount of contract $601,501.00 — Per cent of time elapsed 16.74 %

Estimated cost of completed project, exclusive of engineering $642,721.04

Per cent of contract completed, based on total contract price 12.8 %

Engineering cost to date, $ 4,052.00, 0.67 % — Date project was completed ..., 19...

General information covering progress of work by party and by contractor, important development, instructions to contractors, instructions from Division Engineers, exchanges in personnel of party, etc.:

Cats and scrapers worked all week in the cut between stations 237 and 244+50. The contractor has four scrapers working and has made very good progress.

A small slide developed in this cut, breaking back of the slope line approximately 10 feet and about one half way down the cut slope. Bulldozer opening up the cut at stations 320 to 330.

Culvert crew installing culverts at stations 316 and 322.

Preparing footings and placing forms for floor slab in the box culvert at station 298+66. Drilling for culvert at station 565+78.

Party set slope stakes from station 305 to 314 and from 320 to 333.

Signed (signed) John Doe

Address Grants Pass, Ore.

Mail original copy to Salem and duplicate copy to Division Engineer on Saturday of each week, retain triplicate copy for your own file

	GRADING	SURFACING	MAINTENANCE MATERIALS	OIL AND BITUMINOUS MACADAM	PAVING
Miles in project	5.38	5.38	——	5.38	
Miles partially completed	1.27	none	——	none	
Miles completed	none	none	——	none	
Total estimated quantities	863,000	32,500	1,400	7,300 c.y. 520 tons	
Estimated quantities moved or placed to date	93,000	none	none	none	
Average daily quantities	4,000	none	none	none	
Average daily quantities necessary to complete project on time	5,265	106	4	25 c.y. 2 tons	
Number shifts per day	2	——	——	——	
Hours per shift	8	——	——	——	
Average force on project for week	40	——	——	——	

Percentages of men employed on contract to be secured from:

..... County, ... %; ..... County, ... %; ..... County, ... %; ..... County, ... %

	NUMBER USED AND SECURED FROM COUNTY	COUNTY	COUNTY	COUNTY	OTHER SOURCES	CONTRACTOR'S KEY MEN, ETC	TOTAL
Men							
Men and teams							
Men and trucks under 3 tons							
Men and trucks over 3 tons							
Men and tractors							

Equipment used during week: Shovels 1, Power graders 1, Rollers ..., Mixers ..., Crushing or screening plants ..., Compressors 2, Bulldozers 3, Sheet-foot rollers 1, Cat & Scrapers 4

	WEATHER	HRS. DELAY	CAUSE OF DELAY
Sunday	clear & warm		
Monday	"		
Tuesday	"		
Wednesday	"		
Thursday	"		
Friday	"		
Saturday	"		

CONSTRUCTION ENGINEER'S STATEMENT
Submit 2 Copies with Final Estimate

Prefix 10-1108 Fed. Aid No. 21 A

Date Sept 29, 1944 Contract No. 2100

Name of Project Rock Creek, Coast Highway

1. Give dates contractor actually started work June 4 1944 Completed Work Aug. 2' 44

2. Has project been completed within station to station limits set up in the contract? yes

3. Have all important alignment points been permanently referenced? yes

4. Have all R/W negotiations been completed? yes. If not, give full report.

5. Have all R/W markers been set? yes. If not, give location and reason.

6. Is there any encroachment on the R/W (exact power & Telephone lines? none Give locations.

7. Does the road or R/W encroach on anyone's property? no. Give locations.

8. Has all old R/W been definitely disposed of? yes.

9. Has the supporting data for all quantities been included in your final report and estimate? yes.

10. Has the final 100' = 1" constructed line map been prepared & submitted? yes

11. List field engineering, notes, records & data on hand which you are not sending in along with your final estimate. Do not include weekly reports & correspondence.)

12. Do you expect the contractor to file any additional claims? yes. If so, make detailed report. see attached report

13. State approximately the amount of material still available at each quarry ---
gravel pit 100 talus deposit ----- c.y.

14. Remark briefly as to suitability of material source for future operations Pit exhausted.

15. Have you reported stockpile distribution to the D.M.S.? If not, furnish him with complete tabulation, together with cost of materials at each site.

16. Have you submitted your Bench Mark report in accordance with Circular Letter #192? no.

17. Have you notified the Sign Department and staked the location for the installation of the Federal Aid Marker Posts, if required? yes

18. Have you determined the exact quantity, and submitted supporting data, together with price agreement covering the purchase of excess asphalt, aggregates, cement adjustment, or any other surplus items which would be of value for future maintenance and which the contractor agrees to sell at cost only? none.

19. Have all right of way agreements as indicated on the options been completed to the satisfaction of the grantor? yes

---

Signed (s) John Doe
Resident Engineer.

Address

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